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INDEX TO
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AES BULLETIN

No. 290
FEBRUARY, 1971

EDITORIAL

Unfortunately we are again having to go to press before the publication of the last edition of the *Bulletin*. This of course makes continuity of comment difficult, but I hope it won't deter you too much from sending in your views even though there may be a lapse of an issue before their publication. In the meantime we wish our Printer Mr Phillips a speedy recovery from his recent illness.

I have been very pleased with the number of substantial articles I have received recently containing new and useful practical information. Among them is the first of a series by Dr MacNulty which should prove to be of particular interest to those commencing a study of beetles.

For many of us the AES is a "paper" society our only contact with other members (apart from the annual Exhibition), being through the pages of this *Bulletin*. If you are having any meetings or get togethers at which other members would be welcome, please let us know.

John Bocock (4211)

COLLECTING NOTES—FEBRUARY 1971

The Smaller Moths

In the article which follows I propose to deal with some of the microlepidoptera which may be found during the winter in the stems of their foodplant, but first let us look at Mr E. S. Bradford's drawings. Since he has not yet depicted any of the species I wish to discuss, I have selected *Monopis ferruginella* Hubn. and *M. crocicapitella* Clem. from the stock of drawings he has lodged with me. I have picked them for two reasons. First, their larvae are winter feeders. They are clothes moths, but I do not think you will find them in your wardrobe. According to Ford, their caterpillars feed "on seeds, woollen refuse, stable refuse and refuse in birds' nests" from August till April. Tutt quotes Bignell's authority for their feeding in the flowerheads of Wormwood, *Artemisia absinthium* Linn., but I doubt if they stay there all the winter; old birds'

Front cover illustrations: The water-surface dwelling bugs *Gerris* sp. (adult and young stages) and *Veliacurrens* Fab., the Water Cricket (adult).

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look for the larvae in the early

My second reason is that the moths are so similar that Mr Bradford's drawings together with the notes which follow may prove helpful to entomologists who have found difficulty in separating them. The easiest way to distinguish them is by the hindwings which are purplish fuscous in *ferruginella* and light grey in *crocicapitella*. The former's forewings are darker, for they lack the ochreous mottling which characterizes *crocicapitella*. Furthermore, the upper edge of the ochreous-yellow dorsal streak is slightly arched before and after the hyaline discal spot in *ferruginella;* in *crocicapitella* the edge of the streak is less sharply defined and is more or less straight.

The imagines fly in the summer and are widely distributed; they are, however, rather inconspicuous, and I have seldom seen more than one or two each year.

Now for those stems whose collection offers fieldwork to the entomologist during the relatively dead season of the year. Some of the species I shall mention feed in the stems; others retire there for winter security after having fattened in seeds or flowers. In most instances the presence of the larvae is betrayed by extruded frass or by the carefully prepared exit-hole which is often closed by a window of spun silk. Sometimes, however, there is little external sign and the stems must be split open to establish whether the quarry is there. Its presence once established, it is best to pick the stems intact and trust to a proportion of them being tenanted.

Umbellifers are often productive, Wild Carrot, *Daucus carota* Linn., provides *Lozopera francillana* F. and *Phalonia williana* Brahm (*zephyrana* Treits.); Wild Parsnip, *Pastinaca* (*Peucedanum*) *sativa* Linn., often harbours *L. dilucidana* Steph.; Hemlock, *Conium maculatum* Linn., sometimes yields *L. beatricella* Watson in large numbers.

There seems to be a tendency for these species to occur most freely, but by no means exclusively, in coastal districts. The same is true of the larvae of *Douglasia ocnerostomella* Staint. which winter in the stems of Viper's Bugloss, *Echium vulgare* Linn. Dungeness is a notable locality for this species. If your quest has taken you to a spot where there is a saltmarsh, you should certainly look for Sea Lavender, *Limonium vulgare* Mill. (*Statice limonium* Linn.). A dead flower fastened to the stem, or a small hole where it has fallen off, will show that a larva of *Goniodoma limoniella* Staint. has made its entry. During September it feeds on the flowers in a portable case made from a hollowed flower. When full-fed, it moves down on to the stem and gnaws its way in, leaving its old home as a plug to block the entrance. During the winter some, but not all, of these cases drop off, leaving the entrance hole exposed. Last October, when we were collecting together on a saltmarsh in Kent, a friend showed me a stem with six abandoned florets adhering to it.

Monopis crocicapitella Hübn.

Monopis ferruginella Hübn.

Another stem-feeder which, though it occurs elsewhere, is probably most plentiful along the Thames estuary is *Ostrinia nubilalis* Hübn. If dead stems of Mugwort, *Artemisia vulgaris* Linn., break off easily low down, it may well be the result of the feeding of a larva of *nubilalis*, which should be found just above the break. If the larva is below, it will probably be *Epiblema foenella* Linn. I suggest splitting the first stem open to check that a larva is present, and thereafter picking them with as little disturbance as possible. Until its feeding habits were discovered in the late nineteen-thirties, *nubilalis* was regarded as a rarity, but now that larvae are relatively easy to find the moth is known to be quite widely distributed, at any rate in the south east of England, with scattered records extending as far afield as Durham. It is probably extending its range and its full distribution is still uncertain; its discovery, therefore, in new areas should be recorded. Accidentally introduced into North America where it feeds in the stems of Maize, it has there become a pest and is dubbed the European Corn Borer.

A species new to science was recently found on the west coast of Scotland. This is *Scrobipalpa clintoni* Povolny. Its larva feeds in the stems of the Curly Leafed Dock, *Rumex crispus* Linn. It may well prove to have a wider distribution. I searched for it in a limited area on the coast of west Galway, but there I drew blank.

A much commoner relative is *S. obsoletella F.R.* The larvae mine the stems of *Atriplex* and *Chenopodium* sp. and their exit holes, generally situated near a branching, are quite conspicuous. Pierce and Metcalfe discuss the habitat of this species when they were introducing *S. seminella* Pierce, a very similar species (but not a stem feeder) formerly confused with *obsoletella*. They write "Fischer von Röslerstamm notes that he never found *obsoletella* in the open but always near human habitations, and it is possibly not a saltmarsh species at all . . . Against this seven of my eight specimens of *obsoletella* came from stems picked in two saltmarsh localities in Kent. The eighth, reared from waste ground in London, does, however, support Fischer's opinion.

The last species has already turned our eyes inland, so let us now consider stem feeders that occur in woods or fens. Hemp Agrimony, *Eupatorium cannabinum* Linn. is a common enough plant in many districts. Small holes in slight swellings in the stem indicate the larvae of the Plume moth *Adaina microdactyla* Hübn. Another occupant of old stems of this plant is *Cochylidia rupicola* Curt.; having fed on the flowers and seeds in the autumn, the larvae hibernate and later pupate in the broken stems lying on the ground. The stems of thistles, *Carduus* spp. provide larvae of *Phalonia cnicana* Westw. and *Epiblema scutulana* Schiff. (old gardening gloves are advisable for handling thistles) and Knapweed houses *E. cirsiana* Zell. Ford gives Knapweed as the only foodplant of the last species, but Wilkinson also mentions *Cirsium palustre* Linn., the Marsh Thistle, and I bred my own series from that plant.

Water-Plantain, *Alisma plantago-aquatica* Linn., grows in still, shallow ponds and ditches and the stems stay standing through the winter. They often contain larvae of *Phalonidia alismana* Rag. A sharp frosty day when the water is frozen is best for collecting *alismana*, for then the stems break off cleanly where they issue from the ice and may be drawn to the bank with a stick. A very similar moth, *P. manniana* F.R (*notulana* Zell.), overwinters in the stems of several species of Mint. It is sometimes plentiful in fenland localities where it inhabits Water Mint, *Mentha aquatica* Linn., and Gypsy-wort, *Lycopus europaeus* Linn.

A much rarer fenland species is *Endothenia ustulana* Haw. (*uliginana auct.* nec Hübn); the larvae feed in the stems of Marsh Woundwort, *Stachys palustris* Linn. A common relative, *E. nigrocostana* Haw., favours Hedge Woundwort, *S. sylvatica* Linn., a plant which is more generally distributed. Now I expect there are readers who are inwardly protesting. "This is all very well", they may be saying to themselves, "but how am I to recognise all these dead plants in winter?" It

isn't always easy and the answer is to plan ahead. For example, I took *Endothenia ustulana* at Wicken Fen in 1969; having failed to recognise the foodplant that year, I was helped by another entomologist to identify it in 1970 and I planned to collect the stems of plants I marked down early in 1971.

Larvae in stems normally "stay put", and so there is little need to enclose them in any way until the time of the emergence of the imago. They must, however, be kept out of doors. I often trim the stems and hang them up, like Father Christmas, in old nylon stockings. Alternatively they may be thrust into the soil in an out-of-the-way corner of the garden. Pupation in most cases does not take place till shortly before the appearance of the imago. At this time it is normally an easy matter to chop the stems into manageable lengths for bringing indoors in a suitable container.

A. M. Emmet (1379)

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Monopis crocicapitella Clem. *Monopis ferruginella* Hübn.

REARING A SECOND BROOD OF THE COMMON BLUE BUTTERFLY

Polyommatus icarus Rott.

The County List for Nottinghamshire (Carr, 1916) states that the Common Blue is "very common . . . from early in May to, sometimes, the end of October". My rediscovery of this piece of information a couple of years ago set me wondering whether times have not changed, for it certainly did not seem to be borne out by the colony I was most familiar with near my home. Indeed, in my own experience—although I had never deliberately studied this species—the butterfly appeared to flourish only throughout July, and perhaps for an odd week either side of this month. Since the usual sources of information indicated that there should be at least two broods annually south of the border, I determined to keep a close watch over this particular colony in 1969 and to attempt to breed out a second generation from the first.

This colony that I had in mind lent itself well to observation since it was confined to a relatively tiny area of a long-abandoned railway embankment at Kimberley, which lies some five miles to the North-West of Nottingham. The restricted habitat of the colony was a stretch of

long grasses, on a south-facing slope, and these almost entirely concealed an underlying, luxuriant mass of Bird's-foot Trefoil *Lotus corniculatus* Linn. and Red Clover *Trifolium pratense* Linn.; this patch of Trefoil was the only such patch in a considerable radius of several thousand yards, being bordered on one side by a built-up area, and on the other sides by open meadows and farmland. Although I had been familiar with the locality for a number of years, I had never seen a specimen of the Common Blue more than a few feet from this habitat. Accordingly, I visited the spot at least for a day in each week from the 7th April onwards, but the species did not turn up until the 28th June; on this afternoon, a week after my previous visit, I saw some half-dozen males and a single female, all in very fresh condition. I took a chance that the female was already mated, and I placed it in a makeshift laying cage (an old flower-pot covered with black netting) with cut stems of Bird's-foot Trefoil and Red Clover. Some sixty ova were produced by the afternoon of the following day, and I judged this number to be more than enough for my purposes. The eggs were laid on the flowerheads and on both sides of the leaves of both foodplants.

At the beginning of a spell of very warm weather on the 5th July the ova hatched out almost simultaneously. Since the Trefoil was not immediately available in the vicinity of my home in Nottingham I decided to introduce the larvae to an exclusive diet of Clover from the beginning; this was not, however, an unqualified success. An overwhelming number of the larvae died either without commencing to feed or within a couple of days of hatching. I was left with a nucleus of a dozen which readily accepted the "alternative" foodplant, and these fed —sparingly—throughout July on the cuticle of the cut leaves with which they were supplied. All of the larvae were housed out of doors in a single airtight plastic container, and they received fresh leaves daily. I soon discovered that unless all of the old leaves were immediately removed, several of the larvae would perversely remain on the dried food, ignoring the more juicy delicacy presented to them. By the beginning of August I had observed but one skin-change; the larvae seemed to undergo this operation separately over a period of some ten days, for, despite their simultaneous hatching, they exhibited a fair range of varied growth from no more than three to at least eight millimetres in length. Nevertheless I was quite unprepared for the discovery, a few days later, that one of the more "promising" larvae had wrapped a dried leaf about itself in a loose manner, duly to transform itself into a tiny pupa within twenty-four hours. On 17th August the smallest Common Blue I have ever seen emerged; a perfect but miniature male. The butterfly was lively, and perfecly able to fly; I could find no possible mate at the original locality, where I had last seen the Common Blue—a few very tattered examples—on 26th July. Therefore the specimen was condemned to the cabinet, where it presented a striking contrast with examples of the same species taken in the same locality. Measured,

when set, from apex to apex the specimen spanned just eighteen millimetres, alongside "normal" males' wingspan of between twenty-nine and thirty-one millimetres. None of the remaining larvae fed up in 1969, and their careers, along with their persons, were mysteriously lost during the process of moving house in the late autumn.

I had, therefore, satisfied myself that a second brood of the Common Blue is quite feasible, even in a year when the first brood does not appear until the final days of June. I have found it stated that "Those which will breed in the same year are full fed in some 45 days" (Sandars, 1939); it may be significant that, since this statement refers only to the span of the larva of the Common Blue, my own small specimen encompassed the insect to insect cycle as a whole in only fifty days. The larva fed for only some thirty days. Having little experience with the larval stage of the Common Blue, I cannot add any more, but if one does assume that a second brood of the insect is usual in England, then it becomes easy to see why it may be overlooked in certain circumstances. If the ratio I found of one larva in twelve feeding up in the same year is at all accurate (and all twelve larvae were reared in identical conditions), then presumably only a corresponding eight or nine per cent of the wild population will appear later in the same year. Whereas this may not be apparent in a large colony—the butterflies appearing commonly in two separate periods—it will be very marked in a small colony. I would estimate my particular colony as numbering at most some hundred individuals at one time in July; therefore the handful of butterflies of the second brood could easily be overlooked. Their own chances of breeding must be very slight at such a low population level, and so it would be unusual to see any butterflies appearing "out of season" in the following year. Thus my own colony would appear to have settled itself at a July peak which will remain basically unaltered except by freak weather conditions or otherwise which would result in a disproportionally large second brood. I would be interested to hear of members' experiences with similar small colonies of this species which are apparently single-brooded.

The question of the cause of the size of the specimen which I reared is necessarily an arbitrary one without further reference to experimental breeding, which I personally have not yet carried out. One finds it generally stated through butterfly literature that the Common Blue may differ in size according to certain conditions. One such statement reads "The size varies much. The largest individuals come from the far north and the smallest from the south in years of drought" (Sandars, 1939). It may be that the miniature specimen which I have is in no way exceptional in respect of these southern examples. Indeed the weather at the time of the larva's infancy was very warm; the dependance on cut food might lead to a simulation of the conditions of drought. Since the twelve larvae were reared together and experienced the same conditions, it would have been interesting to observe the

results in the remaining larvae, and thus it is all the more regrettable that these were lost. To these variables of temperature, confinement, and cut food might be added that of foodplant. It is well known that the Common Blue has a variety of foodplants which are taken in captivity; however it is difficult to find the tiny larvae in the wild, and so I personally have no other confirmed foodplant for the wild larvae other than Trefoil. It is possible that the exclusive diet of Clover to which the larvae were subjected may have had a bearing on their development, though I think this rather unlikely. In this eventuality, it would be very interesting to carry out experiments with this species (the second brood is most suitable, since the problems of hibernation do not interrupt to an overwhelming extent the growth of at least some of the larvae) subject to controlled temperature and humidity, and perhaps encompassing a variety of growing foodplants, to determine as far as possible the effect of climate and environment on the size of one of our most common and most attractive butterflies. If any member has already experimented in this field, or in that of relative wingspan measurements in this species, I would be pleased to hear from him.

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REARING THE HOLLY BLUE BUTTERFLY
Celastrina argiolus Linn.

Many animal populations undergo cycles of relative scarcity and abundance. Even a common species such as the Large White butterfly *Pieris brassicae* Linn. may appear to be on the verge of extinction in part of its range. In Spring 1960 I was able to obtain only one record of its occurrence in England, despite having the help of observers throughout the country.

A theoretical account of the relationship between population, prey and predators, hosts and parasitoids is given by Maynard-Smith (1968).

The Holly Blue is a fluctuating species and, because of its habit of tending to fly high around trees, is not easily obtained in good condition for the collection. It seems to maintain itself at a fairly low level of abundance for many years and to have, at irregular periods, bursts of comparative frequency or even great abundance. It was, I think, in 1945 that it occurred in such abundance that wherever I went in the area where I was then living (Bath, Somerset) the butterflies were to be seen on the wing in great numbers. Since then there have been only a few years (such as 1955 and 1958) when one could specify with any certainty where it might be found. Rather, it has been a species which might turn up casually, one specimen, perhaps two or three in one locality, and not be seen elsewhere, or again the same place. To study this species, or to obtain good specimens for the cabinet, means either searching for

ova or larvae in suitable localities, or having the good fortune to capture a female and obtain eggs from her.

There is a churchyard in Watford, Herts. where the butterfly can be seen on the wing, and a hundred yards away is an ivy-covered wall where larvae used to be obtainable by searching. Unfortunately, the wall surrounds a nurses' home, and the entomologist who spends too long peering amongst the ivy is likely to be mistaken for a peeping-Tom! I once collected 25 larvae here by very careful searching of the flower buds in September. However, it was hardly worth the candle (if this is the correct expression) because all but two of them were parasitised. The parasitoid was a small black and yellow Hymenopteron which I have since come to know all too well. When I search holly in the Summer or ivy in the Autumn, to try to find Holly Blue larvae, I always find this parasitoid is searching the same twigs as I am! Nearly every larva I find pupates satisfactorily but produces a parasite instead of a butterfly, and one wonders how it is that some caterpillars somehow escape detection. To rear this species in numbers, I have found it necessary to start with ova, whether collected by searching the food-plant or by capturing a female butterfly.

On April 25h, 1958, I visited a large wood near Ipswich, in the vain hope of finding the Large Tortoiseshell butterfly *Nymphalis polychloros* Linn. which had been reported there in numbers in previous years. A Holly Blue flew out from the border of the wood across the ploughed field I was crossing, and I was able to net it. It proved to be a female, and on reaching home I caged it on a sprig of holly which was well laden with flower buds. She laid freely and I soon had about 30 ova. At that time, holly with flower buds was abundant where I lived (near Rickmansworth, Herts.) but urban development, and the inroads made by people cutting berried holly for Christmas, have now made it very difficult to find accessible branches which bear flowers. As the young larvae hatched they were placed in plastic boxes, as described in an earlier article (Robertson, 1969), and fed on buds and flowers of holly. As they became bigger, they were given the young tender leaves which were by now just emerging from the buds on the bushes. The larvae are said by Frohawk (1934) to be cannibalistic but it is my experience that this is not usually the case. If there is a shortage of food, the larvae which are set to change their skins may be attacked by others, but if food is plentiful this does not seem to occur. I reared mine through to maturity and all emerged in the latter half of June.

The Spring and Summer generations are, of course, quite distinctive in appearance, particularly so in the case of the female. I was fortunate in July of the same year to come upon two female butterflies feeding on bramble blossom in a narrow strip of woodland near Croxley Green, Herts. One was caged with ivy flower-buds (for the food-plant of the Summer and Autumn larvae differs from that of the Spring) and laid numerous ova. Again, I was able to rear about 30 specimens, these

emerging as adults in April 1959. This time I did have some difficulty over cannibalism, because of the feeding habits of the caterpillars. Each caterpillar makes a small hole in an ivy flower-bud and eats away the interior of the bud. (See Tutt for an excellent photograph.) Since the outer covering of the bud is, apart from one hole, undisturbed, it is easy to fail to notice that the foodplant is exhausted, and it is then that cannibalism occurs. Perhaps it is no coincidence that when larvae spin up to change their skins or pupate, they move away from the flower buds on to the leaves, where there is less likelihood of their being eaten by other larvae.

All the specimens I have reared have been rather small compared with those taken in the wild state. Moreover, the difference between the Spring and Summer generations is less marked, for the Spring bred specimens tend to approach somewhat the Summer form. Perhaps this is because when they are reared in captivity and the pupae are kept indoors they experience somewhat higher Winter and Spring temperatures than they would under more natural conditions.

Perhaps one may summarise by offering advice to anyone wishing to rear the Holly Blue. Systematic search for a "good locality" is not very rewarding, because of the scarcity of this species in most years. One can increase one's chances of hitting upon a colony or a single specimen by visiting mixed woodland in April and May. In dry weather the butterflies sometimes descend to feed on dandelion flowers growing in sunny grassy rides, usually between about 10 a.m. and midday only. They frequently feed, too, on the flowers of laurel, particularly where these grow in half-sheltered situations on the eastern and southern borders of woods or tall hedges, where they catch some sunlight. I have seen this habit at Slough in Buckinghamshire and Bricketwood, Herts. On laurel, unfortunately, the butterflies are usually out of reach.

In addition to the rural woodland localities, the Holly Blue is frequently found in churchyards and old walled gardens where ivy and mature evergreen shrubs provide an ideal habitat.

Typical dates for the occurrence of the Spring butterflies are from 27th April to 17th May (these dates are taken from my 1966 diary and refer to Slough). The Summer butterflies are usually on the wing in July and August and in 1966 my Slough records ran from 7th July to 18th August.

To obtain specimens of the Summer generation, from which to rear the following Spring generation, search should be made on the flowers of great banks of bramble growing on the outskirts of suitable woods or adjacent to cemeteries and old walled gardens. The butterflies descend from the tall shrubs and trees to feed at these flowers, more often before noon than later in the day. I have also seen the butterflies feeding at the flowers of Willow-herb *Epilobium angustifolium* Linn. In August and September careful examination of the flower-buds of ivy on old walls and dead trees may reveal eggs and larvae.

Larvae can be found on the developing green berries of holly in June and July, but I have generally found this to be unrewarding. For example, on 4th and 6th July, 1967, two hours searching revealed three full-grown larvae. These pupated on 7th and 8th July, but later proved to be parasitised. When newly pupated, the parasitised specimens can be distinguished from the unparasitised. Holding the translucent pupae up to the light, it can be seen in the parasitised specimens that the contents have contracted to one end—this, presumably, is the pupa of the parasitoid inside the empty shell of the butterfly pupa.

Searching of accessible holly shows that the larvae have attacked and destroyed many of the berries, and where the butterflies are plentiful and berries few they must account for a fair proportion of the fruit. In 1969, a bad year for Christmas holly, the few berries left by the Holly Blue caterpillars in the locality I know were cleared off in a very short space of time by a flock of Fieldfares some weeks before Christmas. I have yet to discover whether there is a relationship between abundance of berried holly at Christmas, and abundance of Holly Blue butterflies in the preceding or following season!

T. S. Robertson

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SO YOU WANT TO STUDY BEETLES: Part I GEAR AND OTHER CONSIDERATIONS

Introduction

I have discussed the idea of writing a series of articles on studying beetles with a number of people. Various aspects have been touched on, studying in the field, how to find beetles, how to keep them alive under artificial condition, how to breed them, tips for collecting. In all these and many others it has soon become obvious that even experts can learn and that nobody has all the answers or knows all the best ways to achieve an objective.

I have decided therefore to write a series of articles covering various aspects of the study of beetles. I am assuming that the reader has for some time been interested in Natural History and Biology and has decided that he (or she) would like to take up the study of beetles. I assume no more than this, so those with greater knowledge must be patient for often the apparently simple matters are omitted from text-books and articles and only discovered by chance, when a few words in print could save much arduous labour.

The days of mere collections in the writer's opinion are over or at least numbered at any rate in countries as well catalogued as Briain.

Now that the need for conservation has been realised it is obvious that mere collecting should be avoided. However it is no use attempting to study beetles without acquiring a small reference collection. One male and one female with perhaps one specimen to display the underside should be sufficient. For whatever purpose one collects beetles one needs a certain minimum of gear. Before one can study beetles one must find them and ordinary collecting methods are often the best way to do this. I shall just therefore describe the simplest apparatus much of which can be made quite cheaply at home. There is no necessity to obtain or make it all at once.

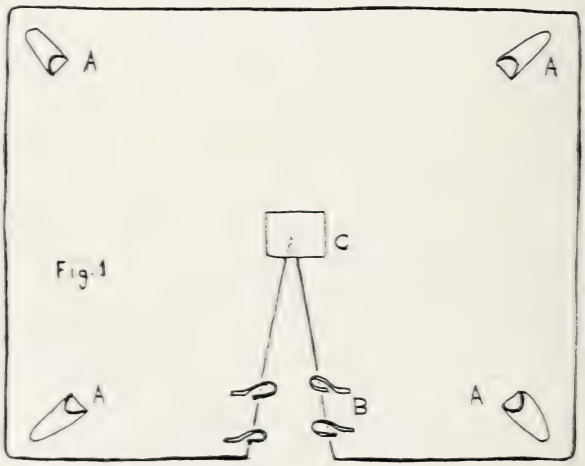

Fig. 1

Equipment

A certain amount of equipment will be required of which a beating tray, a sweep net, a wood chisel and a mallet, a good magnifying lens and glass collecting tubes are the more important. You will also need a piece of waterproof sheet, a cold chisel and hammer and a few other implements which will be discussed later. All these can be readily purchased from any reputable entomological dealer. However this may cost quite an amount of money and certainly many beginners will prefer to make what they can. Useful descriptions of equipment can be found in several publications.

The Beating Tray. Essentially this is a piece of material held out in the form of a stiff platform by a light wooden framework. The size of the platform can vary between eighteen by thirty inches and at the most three feet by two feet. The latter is a little too large, although for many years I used a tray of my own making which was about four feet by three feet. Obviously for ease of transport the beating tray should be collapsible and readily put together. If you are making your own

you can make the size most suitable to yourself. Remember that whilst a big tray covers a larger area, it is heavier and you will tire more quickly using it, and it can rapidly become unmanageable if there is any wind. The tray I use today is the Bignall Beating Tray. It is the most sophisticated that has been developed. This has an upward curving lip to prevent captures falling or being blown over the edge of the tray. This is beyond the capacity of most people to make, but if you are going to buy a beating tray it is probably worth paying the extra money (the present price is about £5): with reasonable use a good one should last a lifetime.

If you are going to make your own, two designs are suggested. For the first you will require a piece of material three feet by two feet, hemmed all round the edge (see Fig. 1). Calico or strong linen was used in the past but nowadays nylon proves very successful. The brushed variety, not the semi-transparent shiny material should be used. In the centre of one of the longer sides make a cut as far as the centre of the material. Hem this and sew an additional small square or oblong across the end of the cut to strengthen it against tearing. Make a small pocket at each corner of the material (A) and make two stout loops of material at each side of the outer edge of the cut. Get four stout garden canes about twenty-two inches long (if your tray is a different size from three feet by two feet you may have to adjust the cane length). To get good thick canes you may have to buy six foot canes and cut off the thinner ends. Choose and cut the canes so that there is a node close to the end. Get two canes two feet six inches to three feet long. Place the thin ends of the four shorter canes one in each of the four pockets (A). Holding the free end of each cane in turn over the centre of the material and

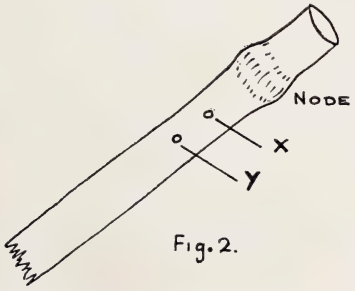

Fig. 2.

holding the centre of the material firmly, push the cane towards A until the material is taut. Mark the part of the cane that is over the centre of the material (Y). Then mark a point X a quarter of an inch from this towards the end of the cane (Fig. 2). Remove the four canes and drill a hole at X equal in size to half the diameter of the cane at that point. Drill the same size hole through each cane (choose the thinnest cane to determine the hole size). Canes must be chosen so that there is a node between X and the end of the cane as the node prevents splitting.

Replace the thin ends of the four canes in the pockets A bringing the holes X together over C. Then take two canes two foot six to three feet long, drill holes at the thick end of the same size as the holes at X; insert these canes through the loops B so that the holes coincide with the holes at X. Finally using small metal washers each side of the canes join the holes together with a nut and bolt. Adjust the nut to a suitable position and fix in place tightly with a locking nut. You now have a tray that can be readily closed by rotating canes that are through loops B about the centre from six to twelve o'clock in Fig. 1. If a very small hole is drilled in cane ends at A the pockets can be sewn to the cane ends thus preventing the canes from slipping out of the pockets when the tray is in the folded position. You may have to adjust the order in which the canes are inserted on the bolt to get best results, normally clockwise starting with a cane adjacent to the handles. The diameter of the bolt should be one or two sizes smaller than the holes in the canes and the canes should not be rigidly clamped together but only held fairly loosely. If put together correctly the cane structure should form a very shallow bowl with the working surface stretched above it.

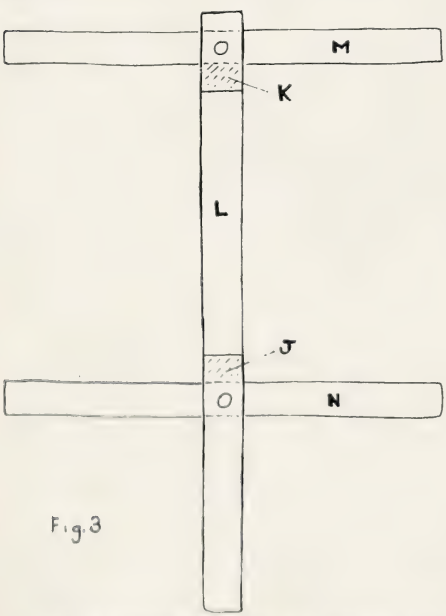

Fig.3

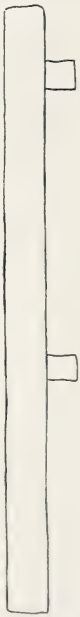
Fig.4

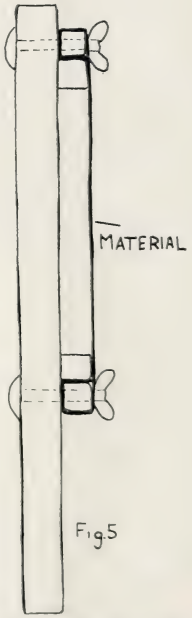

Fig.5

The second pattern of tray is somewhat easier to make. A wooden framework as indicated in Fig. 3 is made up of half inch or inch square good seasoned timber. The better the wood the thinner the sections of which the tray is made can be and hence the lighter the finished article. L is the centre strut to which cross pieces M and N are attached. J and K are square positioned pieces attached permanently to L. M and N fit

as close as possible to K and J so that no rotation can occur. The end of nylon rectangle is suitably attached to M and N to form the body of the tray. M and N are attached to L as shown by wingnuts and bolts which can easily be removed and the tray dismantled for transport. The one disadvantage of this type of tray is that the wing nuts and bolts are easily lost during transit or dismantling and it is advisable to carry a spare pair. To use the beating tray we require a stout cane about four or five feet long. Hold the beating tray under the branch of a tree, bush, or low growing plant and give the foliage a sharp quick sharp tap that gets the best results. Examine the tray. You will be surprised how many insects you have dislodged. Many people use a walking stick but I find this unduly heavy and can be very tiring.

The Sweep Net. This is another must. Again you can buy the item, however it is again cheaper to acquire one's own. I do not recommend attempting to make the handle and frame. Those used for small keep-nets by anglers can be obtained readily for a few shillings. This has the advantage that it folds up and the handle is detachable. The handle has a cork grip and is 12 inches long and the net frame when opened out is approximately 16 inches in diameter. I use a white brush nylon home-made bag attached to the frame in the usual manner. Over the lip of the bag is a reinforcement of rexine which more than quadruples the useful life of the bag. A sketch of the bag is shown in Fig. 6. The net is used to sweep through grass and low growing herbage. In addition to the above you will need a three inch or two and a half inch wood chisel and a mallet, a good strong garden trowel and a waterproof sheet about three feet by four feet. Any sort of sheet will do though rubberised cloth is perhaps best but PVC or polythene will do equally well.

Finally, you will need a series of glass tubes with cork stoppers in which to collect your specimens. The following stock is recommended as a reasonable minimum to cover all sizes of beetle.

$1\frac{1}{2}$in. x 3/10in.—Half a gross
2in. x $\frac{1}{2}$in. —Three dozen
$2\frac{1}{2}$in. x 1in. —Two dozen
3in. x $1\frac{1}{2}$in. —One dozen

Tubes can be obtained from entomological dealers or chemical wholesalers. A good magnifying pocket lens x 10 magnification will be needed for observing many of the smaller beetles as well as details of the larger ones. They can be obtained either from an occulist or from entomological dealers. Prices vary but should not be more than thirty shillings.

With the above equipment most methods of finding beetles are within our grasp. Occasionally other equipment is needed but this will be mentioned in later articles as necessary.

Whenever you are collecting you should have beating tray, sweepnet and chisel to hand. Other equipment should only be carried when you know from experience that you will require it. Carrying unnecessary

equipment only gets in the way of collecting and makes it more difficult to carry out collecting procedures.

One further word on the use of equipment. When collecting beetles only put one specimen in each tube. The beetles may well damage, or even eat, each other, still worse never open a tube with a specimen in it in order to put in a second. This often leads to a loss of one or both the specimens. Still less, do not try to collect numerous specimens in a single tube. Only too often have I seen the catch of the day lost through collecting in this manner.

Identification. There are unfortunately very few books which give reliable keys to the identification of British Beetles and nearly all of them are out of print. They are also fairly expensive, when available second-hand. There are however a number of keys to the identification of Coleoptera at reasonable prices in the *Handbooks for Identification of British Insects,* published by the Royal Entomological Society of London although this series is far from complete. Those available can be obtained from the agent E. W. Classey, Ltd. The following books are out of print but second-hand copies can be obtained from time to time. They tend to be expensive.

Fowler 1887. *Coleoptera of the British Isles.* Reeve.

Joy, N. H. 1932. *A Practical Handbook of British Beetles.* Witherby.

Reitter 1916. *Fauna Germanica Käfer.* (In German.)

Die Käfer Mitteleuropas. Editors Freude H. Harde, K. W. Lohse, G. A. Cocke and Eveas is in course of publication, it is an excellent book and covers the English fauna. Identification of one's catch therefore poses an immediate problem but one that is not insoluble. My personal advice is to collect all the parts of the *Handbooks for the Identification of British Insects Vols. IV and V,* which refer to Coleoptera, that have been issued and to join a society which has a good library and collections available for use by members. Careful comparison with authentic specimens is an excellent way of identifying them. Whenever possible a key should be used as well since this highlights the differences between closely related specimens. A society which has both library and large collections is The British Entomological and Natural History Society, which resides at the Alpine Club, 74 South Audley Street, W.1.

Now we have our equipment the first step in studying beetles is to go out in the field and find some. Some we will observe in the field and when we have found out as much as we can about them, suggestions for further work will be made. This will be the subject of future papers. The possibility of breeding them in captivity will be discussed and ways of doing this suggested. We have detailed knowledge of the life history of about fifteen per cent of our beetles (most of these are of agricultural importance) and a bare outline life history of at the most another twenty per cent. About the remaining two-thirds we know virtually nothing. Therefore much of the work of breeding various Coleoptera must be good experimental guesswork. It is hoped that this series of articles,

when completed, will have persuaded a number of our younger entomologists to embark on the painstaking but exciting task of elucidating the complete life histories of our native Coleoptera.

B. J. MacNulty (4528)

NOTES FROM A FINNISH DIARY—V
SOME COLEOPTERA

Since there are in Finland some 3,300 known species of beetles, it is obvious that, whatever one's particular sphere of entomological interest, one is likely to meet quite a number of them in the field. Of course, it is the more colourful or larger beetles which arrest the attention, and it is with a very few of these that this article is concerned.

Fam. Coccinelidae

The Coccinelids illustrated (Fig. 1) are of interest because they represent specimens all of which were collected from a single half-grown Alder tree *Alnus* sp. This tree was growing at the edge of a bay of Näsijärvi lake referred to in *Bull. amat. Ent. Soc.* **27**: 121-128. On 27.5.67 twenty-seven beetles were boxed from this tree within a few minutes, of these, nineteen were Coccinelids, four were referable to the Curculionidae (Weevils), one to the Elateridae (Click-beetles), and three were so small that I was unable to identify them using the rather general handbooks which were to hand. The Coccinelids were easily separated into eight different species, which I hope I have identified correctly. None of the other trees investigated in the immediate vicinity produced any more specimens, and I am unable to offer an explanation as to for what reason that particular tree harboured so many. There were no aphids about, either on the trunk or on the branches with their bursting buds. The wind was quite stiff at the time, coming across the lake from the north-east. It was a cold wind in spite of the spring sunshine. I can only turn the matter over to our coleopterists and hope that they might have some theories to put forward.

Fam. Cerambycidae

In a land of "green gold and granite" it is natural that the Cerambycids, in view of their associations with wood, should be, if not so diverse in form as in tropical regions, at least an important part of the forest insect fauna when individuals are taken into account. Two of the most commonly seen species are *Rhagium mordax* De Geer. and *R. inquisitor* Linn., which are to be observed in May and June in an almost hyaena-like attitude of head in the air, posterior forced downwards, perched about stacks of recently-hewn logs. Their antennae, of course, are extremely short in comparison to those of such bizarre species as the Timberman, *Acanthocinus aedilis* Linn., the male of which sports a pair of these structures almost six times the length of the head, thorax and abdomen combined (Fig. 2).

Fig. 1: Coccinelids taken from an Alder Tree, 27.5.67:

a. *Anatis ocellata* Linn.
b. *Coccinella 7-punctata* Linn.
c. *Paramysia oblongoguttata* Linn.
d *Coccinella 5-punctata* Linn.
e. *Hippodamia septemmaculata* Deg.
f. *Chilocorus renipustulatus* Scriba.
g. *Coccinella hieroglyphica* Linn.
h. *Propylea quatuordecimpunctata* Linn.
i. *P. quatuordecimpunctata.*

On May 1st, 1968, I obtained two females and a male *A. aedilis* from a felled pine log. The beetles were grey-brown in colour, with dark markings, though their initial "bloom" faded after a few days' activity, and when disturbed they made the same sort of "squeaking" sound as beetles of the *Geotrupes* type. When you picked one up, you felt that you had acquired it for life for, its antennae arched forwards, it would flatten itself against your palm and hang on grimly with its hooked tarsi, a position from which it was about as easy to prise away as a hill-billy from a gin bottle. There was no way of removing them without

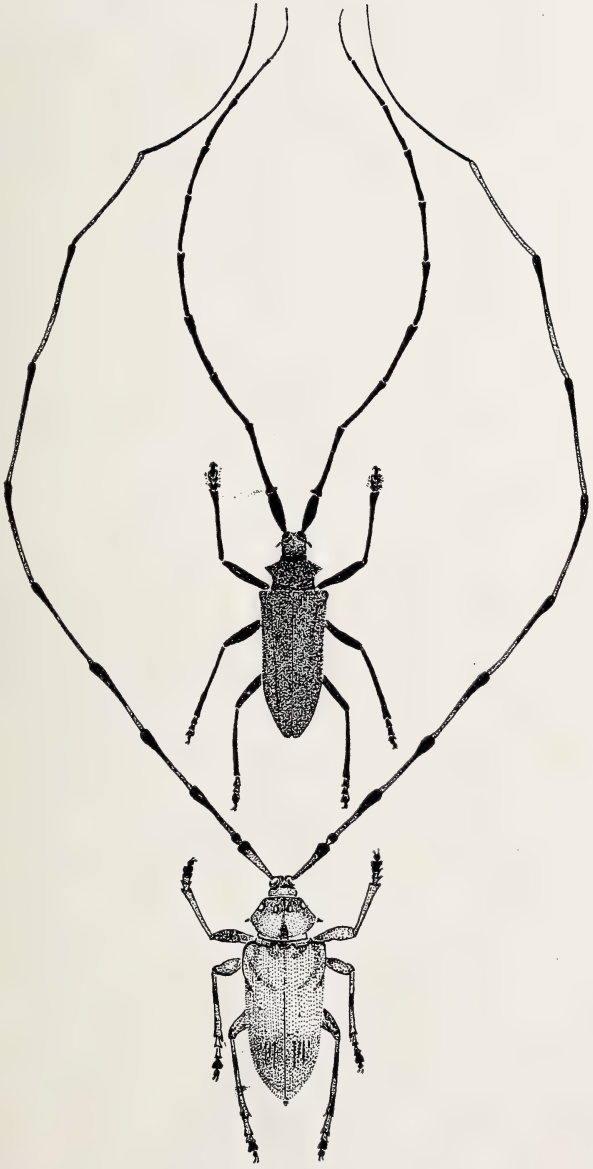

Fig. 2: Two Common Finnish Cerambycids—*Monochamus sutor* Linn. (above), and *Acanthocinus aedilis* Linn. (below).

risking damage to their fine antennae, and they were eventually committed to the ethyl acetate killing bottle. I do not know how long they took to die, as I left them alone and brooded upon the disadvantage of having a first-floor apartment instead of a zoo.

This year (1970) we obtained sixteen specimens (12 males; four females) during May 26th–30th, from a pile of pine logs that had been cut the previous year. Some of these were put together in a large breeding cage with a section of sappy pine, where a male, when placed within inches of a female, would obligingly leap upon the unfortunate creature before you could get the cage door shut. Hopes of obtaining ova were dashed, however, as the females one by one appeared on the cage floor with their feet in the air, as dead as they could get.

The species is said to be fairly common in Finland, emerging during May and June. It appears to be normally single-brooded, but Kontanen, working in south Karjala (61°N.) found it to be there double-brooded, as is the case in central Europe. The female's ovipositor is some 3–4 mm long when retracted and this, together with the antennae, which are about half the length of those of the male, enables the sexes to be easily distinguished. The larva lives principally under the bark of pine, *Pinus* sp., but will also consume spruce, *Picea* sp.

The second species illustrated in Figure 2 is a male *Monochamus sutor* Linn., which, in trying to avoid my sun-scorched torso, came to grief on a beach of Oulujärvi lake (central Finland) during the first week of August, 1967. This innocuous creature was unlucky enough to succumb to the cogent fumes of an obscure species of sub-arctic plant that my wife put into the box "to keep him happy". Having failed to pin down the origins of this new killing-agent, I carded the specimen and looked up some facts about it. It is a hardwood species, thriving in the early stages on both pine and spruce. The adult appears between the end of June and the middle of August (depending upon the latitude), being uniform dull black in colour, with many pits over the elytral surfaces. *M. sutor* is common in Finland, its range extending into Lapland, and there is one brood per year.

Beetles of the genus *Leptura* are fairly frequently encountered during June, July and August. These include *L. rubra* Linn., which exhibits a striking sexual dimorphism in that, whereas the male has a black prothorax and yellowish-brown elytra, the female is of a startling reddish-brown colouration. These beetles measure between 12 and 18 mm, the females generally being at the larger end of the scale. The smaller (8.5–11.5 mm) *L. sanguinolenta* Linn. and *L. inexpectata* Jans. & Sjöb. (8.5–12 mm) exhibit a similar colour distinction between the sexes. These beetles inhabit as larvae rotten or semi-rotten pine or spruce wood, feeding to a considerable depth. They may persist for several generations, covering five years or more, in the same slowly-rotting trunk.

Saperda carcharias Linn. is a beetle of some repute among coleopterists, possibly partly because its large size (22–28 mm—ref. Saalas) makes it an attractive exhibit. I was collecting on August 11th (1970) with my good friend C. David Gadd who, after several years of separation from our joint butterfly collection, had managed to flit over from Canada for a guided tour of southern Finland. We were working a damp meadow at the time, and seeing a large beetle clinging to an aspen shoot (*Populus tremula* Linn.), David swept it into the net he was carrying. It was a welcome addition to my steadily-growing collection of "more colourful or larger beetles" (!), though we scarcely had time to examine it closely before I spotted another large beetle zooming aimlessly round above a pin-cushion of aspen shoots. Catching it was a spectacular operation involving my companion falling into a smelly ditch, the net acquiring three new openings by courtesy of a single strand barbed-wire fence, and myself gently picking the specimen off an aspen shoot when it came into land. This second individual was a male, of length only 18 mm, in comparison to that of the female, which was 24 mm. The antennae of both specimens measured 20 mm in length. The female is a far more robust beetle and like many beetles, when the sexes are placed side by side, one is reminded of one of those old-fashioned postcards in which the obese wife dominates a grossly undersized spouse. In the early stages *S. carcharias* dwells in living aspen wood, in which it steadily carves its way towards the centre. Of its three smaller common relatives, it is the black-spotted *S. perforata* Pall. which is most easily distinguished.

Strangalia quadrifasciata Linn., an orange and black species (length 13–20 mm) is another Cerambycid frequently encountered during June and July. Its larva eats the bark and wood of deciduous trees—principally birch, *Betula* spp., in Finland.

It is not possible to devote any great space to an examination of the economic importance of Cerambycid beetles. Of those that I have mentioned, it is clear from the feeding habits that some are regarded as pests, but *A. aedilis* is not frowned upon too much, as its larvae tend to attack the wood immediately beneath the bark—a part of the tree which is discarded in any case in the wood yards.

Fam. Carabidae

To most of us, I suppose, the term "Ground-beetle" conjures up visions of a scuttling insect of an unexciting blackish hue that occasionally gets overlooked as a bathroom immigrant until its froth-festooned corpse drifts by on the sponge. Being something of an ignoramus myself in this direction, I was shocked to the core when my wife picked up on a pine bog (on 30.5.70) the most beautiful ground-beetle I had ever seen. Its elytra were a magnificent metallic bottle-green colour, with the margins of these, and the whole of the pronotum, a glistening purplish-bronze hue. Though only 14 mm in length, it was a most spectacular insect, and it was with horror that I learned that,

thanks to Linnaeus, I should have to refer to it as *Carabus nitens* Linn.!

A larger Carabid, *C. cancellatus* Illig. I have also found only once—in this case on cultivated land. The raised granules arranged in lines on the elytra are a characteristic of this handsome beetle, which has a convex shape enabling it to be distinguished from its similarly adorned, though flatter, relative, *C. granulatus* Fab.

Fam. Scarabaeidae

The Rosechafer, *Cetonia aurata* Linn., is very common during late May and throughout June, being found in twos and threes wherever there are sallow bushes, *Salix caprea* Linn., in the male inflorescences of which it practically buries itself so that its dark metallic green form becomes coated with pollen. *Oryctes nasicornis* Linn. is a buxom member of this family which, arriving some years ago from India, has spread northwards as far as Jyväskylä (62°30′ N.). It is glossy brown in hue, up to 37 mm in length, and the male has a "horn", giving it a "Rhinocerous beetle" appearance. It is a nocturnal insect, being met with fairly commonly during July and August, when the females seek out decaying wood in which to lay their eggs. More often than not, however, the amorous male of the species is discovered in a pulverised condition on the roads where Mr Bachelor Finn, likewise armour-plated, has sought to entertain *his* lady-love in the gathering dusk of a warm day.

30.8.70 Leigh Plester (2968)

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COLLECTING AND CONSERVATION

One wonders how much real impact collectors have upon the status of any particular insect and whether the arguments between collector and conservationist have any great relevance when related to the insect world. The shooting of rare birds or the collecting of their eggs, the hunting of wild animals for trophies for collectors or for their control as nuisances have been shown to be capable of bringing a species to the point of extinction but this has been so only where the species and habitat are very restricted. The years of collecting eggs and trapping wild birds did not do one scrap of the harm that has been achieved by the recent use of poisons in agriculture and the changes in agricultural and forestry practices. The Otter hunters never destroyed the Otter—this has been done by the pollution of our rivers. There is a case for the restriction of collecting and hunting of rare species anywhere now that so many of these forms of life have been brought near to destruction by

the attacks upon their environment. This is a valid argument to be used against the collection of insects which are scheduled as being in danger and which inhabit a restricted locality. In this case the Conservationist is right to say "put aside your net and take up the camera" or more usefully, "study the insect in its habitat and find out why it is in danger". To make the name "Collector" a dirty word is, in my opinion, going too far. I work as hard as most in the cause of conservation in its many aspects but I am against banning the Collector for several reasons.

Those persons who are most actively concerned in conservation, in almost every case, are those who have come to have an interest through starting as a collector. Even the active collectors have a vested interest in conservation—the bird population of our coasts owes much to the Wild Fowling interest and the Fox might be as dead as the Dodo in our Islands if it were not for fox hunting. Most insect conservationists have started as collectors and many still collect—wisely and with the needs of conservation always present in their minds. Our Society acts more than any other as a channel through which newly interested persons are brought into contact with Entomology and active entomologists. Most of these newcomers are collectors or breeders of insects and to close our Society to them would be the most short-sighted thing we could do. These people will be the entomologists of the future and those who in the future will supply the need for amateur entomologists in the field of conservation. Our task is to increase their interest in insects to the point where they want to help in preserving our insect fauna for posterity and voluntarily direct their collecting urge into those channels which are most beneficial to the general cause of Entomology.

In my own experience most Naturalists' Trusts and other conservation groups have little knowledge of or concern for the invertebrae fauna. Those of us who belong to the Conservation Group of the A.E.S. are attempting to encourage our members to fill the gap by providing informed amateurs who can join and advise such groups. To limit the Society to non-collectors would dry up any supply of young enthusiasts and deny us the chance of educating youngsters and novices towards an acceptance that their collecting activities must always be directed towards the preservation rather than the diminution of our native insect fauna.

Collectors still have a lot to add to entomological knowledge in regard to the orders other than "Lepidoptera", as to distribution, taxonomy and habitat and without some collecting our positive knowledge on some of these points will progress very little. It is unfortunate that so many collect Lepidoptera, the order about which we know probably the most, but this group does still offer a lot of work to the amateur in the matter of field observations. However I see no harm in collecting even Lepidoptera as long as the collector is fully aware of how precarious some species' existence has become. Our Society can emphasise the need for the collector to study the status of an insect before he decides that he is justified in killing specimens but we will

achieve nothing by banning a collector—we may well lose any opportunity we now have of influencing him towards moderation.

Our Society has set its face against any trading in species which have been designated as being in danger, as to establish a market for rare insects could encourage unscrupulous people to collect for gain. It is of course possible to breed in captivity insects which are rare and it has been argued that the offering of these for sale is not objectionable but the Society feels that this can be a dangerous practice as there is no certainty that such a market could be controlled to prevent collected material being sold as "bred". The sale of material from old collections does much to fill the need of those who wish to secure type specimens for collections and it is felt that this is still permissible though it could be abused. We would not like to see the present position in regard to the sale of old bird egg collections being imposed in the field of entomology. Restraint on the part of all concerned will avoid such a position arising although there does appear to be some pressure in this direction.

It has been suggested that our Society should sever ties with those who practice as entomological dealers but this again achieves nothing. We know the persons who are dealers; we hope we have their sympathetic ear and, I trust, some influence in obtaining their support in the field of conservation. If the Society found that a dealer was abusing the confidence that we place in him there are means of bringing this to the notice of our members and this could be much more effective than a general rejection of dealers as members or promoters of our Society. As one who sees the application forms of our new members, I am very much aware of how much we owe to these people in the way of introductions to the Society and without a continuing flow of young members the Society must founder.

My own comments on this matter are therefore that we should continue to act as the Society for the true Amateur, whether collector or conservationist, encouraging and instructing by means of our *Bulletin* and publications, using all the means of communication available to us. At the same time we must encourage a more mature attitude towards entomology so that more and more members graduate from the pure "collector" to the status of "entomologist" with a wider vision of the ecological importance of the Insect World.

13.12.1970 P. W. Cribb (2270)

ANNUAL EXHIBITION, 1970

The Annual Exhibition was held on Saturday, 26th September, 1970 again at Holland Park School, Airlie Gardens, Campden Hill, Kensington, W.8. The earlier date of the last Saturday in September started last year was so successful that it is proposed to make this a regular one. Also the modern spacious accommodation at this School has greatly enlarged the scope of our operations, notably in regard to seating,

catering and accessibility. Despite the excellent weather, attendance may have been slightly lower than last year's record numbers but noting that some 1,300 cups were used for refreshments and that only part of our visitors used this service, the number of persons visiting the Exhibition must have been well in excess of 1,000.

A concensus of opinion from Members, Visitors and the wide range of Dealers all spoke of a very successful Meeting. The Council are confident that the Exhibition is fully meeting its objectives of bringing Members together for an exchange of news and views, that it is a convenient opportunity to inspect and buy entomological supplies and an occasion to meet the Council Members. The one branch that appeared less flourishing was the presentation of members' own collections and projects. We feel that this is an essential part of the Society's life and whilst there was a reasonable number of first class items, a high percentage of members attending had not contributed anything to the display. Most active naturalists could show something of the Orders with which they have been occupied.

As in past years, two prizes were awarded for the best Junior exhibits. It was appreciated that some of the younger members were contributing to joint Group efforts but of necessity, prizes were given for individual efforts. After consultation, D. J. Longman (4042J) and R. J. Williams were chosen: details are given in the General Summary.

Summary.

A special word of appreciation must be addressed to Mrs Hilliard and the team of Ladies who provided a first class refreshment service from 12.30 p.m. onwards. This contributed in no small way to the success of the afternoon and financially was beneficial both to the customers and the Society. Our thanks are also due to the many members who undertook essential and often laborious tasks, notably E. Bradford who designed all the posters, J. Muggleton (3253) who performed the setting demonstrations, B. F. Skinner (2470) the electrical matters, Philip Cribb who supervised the Enquiry Desk, P. Taylor (3571) who sold surplus material for the Society's funds and G. Prior (3909) who attended to many of the day to day arrangements. Overall our congratulations to our Organiser, P. Cribb (2270) who was responsible for the whole organisation, well assisted by the friendly co-operation of the School Housekeepers.

An effort was made to look at all the exhibits and discuss them: it is regretted that a few projects lacked the member's name.

ADAMS, C. (4285) Butterflies of W. Reading (Berks.) district. Specimens, paintings and Map with Key.

AES CONSERVATION GROUP. Promotion of the various County Naturalists Trusts and also investigations into various species of several orders known to be in danger.

APPLETON, D. (3631) Coleoptera from S. Hampshire. Also Hymenoptera, notably sub-order Parasitica.

BARNARD, N. (4343J) The Painted Lady Butterfly *V. cardui* F. breeding in W. Suffolk.

BEER, N. J. (3596) Larvae of *H. celerio* Linn. Silver-striped Hawk-moth, feeding on fuchsia.

BENHAM, B. R. Plastic resin—a new method for preserving insects without deterioration of colour. Not yet suitable for Lepidoptera.

BETTS, B. H. (4736) Series of *N. antiopa* Linn. Camberwell Beauty Butterfly. Also examples of the damage caused to beehives by several species of moths.

BIOLOGICAL RECORDS CENTRE, MONKS WOOD. Progress of the Lepidoptera recording scheme covering the British Isles, with maps to illustrate.

BRITISH BUTTERFLY CONSERVATION CENTRE. Details of aims and current operations.

CALE, M. (4060) Coloured enlargements of British Coleoptera.

CLARK, N. MISS. Examples of the Gulf Fritillary, *D. vanillae*, and White Stripe Tiger Swallowtail, *P. eurymedom* B., butterflies from California, USA.

CRIBB, P. W. (2270) Comprehensive type collection of butterflies noted in Spain during July, 1970. Also series of the British races of Marsh Fritillary Butterfly *E. aurinia* S.

DE WORMS, C. DR. Series of Clouded Yellow Butterfly *C. croceus* F. to illustrate variation, Grayling Butterfly *E. semele* H. to show the British races and also a collection of Butterflies from the Mombasa district of Kenya.

ELSE, G. R. (3881) The Great Green Bush Cricket, *T. viridissima* Linn. breeding in Hampshire.

EMMET, A. M. COL. (1379) Lepidoptera, mainly micro-lepidoptera, taken and reared in the UK during 1970, including *Stigmella paradoxa* F., new to the British list.

EXOTIC ENTOMOLOGY GROUP. The successor to the Silkmoth Rearers Group. The scope has been extended and also includes Hawk-moths.

GARDINER, B. O. C. (225) showed on behalf of the Dept. of Zoology, Cambridge, broods of blood sucking bugs Hemiptera mainly parasitic on mammals including man and collected in Venezuela.

GOODBAN, B. S. (217) Series of Magpie Moths *A. grossulariata* Linn. showing the extreme variation obtained from selective breeding.

GRAINGER, J. (4562J) Insects caught whilst on holiday in the Algarve (Portugal), this year.

GREY, P. R. (3820) Collection of Butterflies from the Lermoos area of Austria. Also specimens of silkmoths Saturniidae, easily reared in this country.

HARMAN, T. W. Typical moths of the Derbyshire Moorlands.

HEATH, G. (4409), HEATH, J. (4573) Species of Stick Insects and Mantids.

HILLIARD, R. D. (99) Type specimens of the moths noted at a London suburban (Stanmore) m.v. light trap on the best night experienced in 1970.

LONGMAN, D. J. (4042J) Detailed study of the arrival times of moths at a m.v. light trap. Results show that flight periods are constant for most species studied.

LONDON ZOOLOGICAL SOCIETY. Live species of many orders, from the Insect House at the London Zoo.

LYNN-JONES (4172J) Lepidoptera collected in Austria and Bavaria.

MACNULTY, B. J. (4528) West African Lepidoptera. British species of the four families of Scarabaeoidea, beetles associated mainly with dung and dead or dying trees.

MILLARD, S. P. (4372J) Variation in British butterflies and specimens of Lesser Stag Beetle *Dorcus parallelipipedus*.

MOSS, E. M. (3013) Type collection of British Syrphid Flies (Hover flies).

NATURE CONSERVATION GROUP. Details of various projects.

PENNEY, C. C., MCCORMICK, R. F. (3880 and 3375). Butterflies and Moths including Pyralids taken in the field and at light this year.

PRIOR, G. (3909) and MRS. PRIOR. Sub-alpine Lepidoptera noted at Tarranz, Austria, this year.

ROTHAMSTEAD INSECT SURVEY. Survey of the insect trapping scheme which has been in continuous operation from 1932/36, 1946/49 and 1960 onwards. Also details of the Standard Pattern Light Trap.

ST. IVO NATURAL HISTORY SOCIETY. Large exhibit showing species of many orders currently being bred by the School Natural History Society.

SKINNER, B. F. (2470) Bred species and varieties of British Lepidoptera.

TEEN INTERNATIONAL ENTOMOLOGY GROUP. A Branch of a worldwide entomological group specialising in field work and breeding.

TURSH, M. A study of two rare Elaterid beetles, *Megapenthes lugens* R. and *Procraerus tibialis* Linn. notably their anatomy and distribution.

WATERS, A. P. (2615) A collection of Spanish butterflies including bred series.

WHITE, I. M. (4377) Alpine Coleoptera and map of relative localities.

WILLIAMS, R. J. General survey of the macro-Lepidoptera of the Orpington area (Kent).

YOUNG, L. D. (4012) Varietal forms of the Small Copper butterfly, *L. phlaeas* Linn.

R. D. Hilliard (99)

JUNIOR NEWS

The beat music of our local Autumn Bush Crickets holding a folk festival and the fact that I have just been challenged to a fight on the way home from work by a big bluffer Devils Coach Horse Beetle, prancing around with its tail in the air and jaws wide open reminds me that winter is on its way. I can now hope to be flooded out with newsy letters.

From the number of complaints I have received it appears that quite a few of you missed the junior section of the last two *Bulletins* with their exciting news and research inspiring quizzes. I suppose the reason why you sent me so little news was that the gloriously long summer kept you too entomologically busy—my quill pen is out and the ink is ready, please write.

Have you been making special studies or been any place special this last season? I expect that everyone has been eagerly seeking out the insects and other animals of which the Nature Conservancy are making records (not gramophone records) with the cooperation of learned societies like ours.

I have been keeping a special eye out for Bumble Bees and was fortunate enough to get a complete nest of the surface builder *Bombus ruderarius*, the Red Shanked Garden Bumble Bee. They had to be taken at night when the Queen and her thirty-two workers were at home. I transferred their home to my garden where they thrived throughout the summer in my observation box, flying free. By the way Bumbles may be "Humble" but they can sting, so far I have been lucky.

During the last fortnight of July St. Ivo School, Entomology and Natural History Society, rudely known as the "Boys' Club", took me with them in search of monsters into unknown Belgium, and the Ardenne Hill forests are just that. You ought to see the Fritillaries, White Admirals, Map butterflies and Large Coppers, yes, Large Coppers! There were also lots of gorgeous beetles including Sawyers, Longhorns and those little "Spud bashers" *Lepinotarsa decilineata*.

We caught blue mottled "Alpine" newts, Wall Lizards, Midwife Toads, Smooth Snakes and the most magnificent of all newts the Fire Salamander. Our accommodation was the homely Youth Hostels of the area and travel was by train and Shanks' Pony. If you should ever go to East Belgium do see the caves at Hansur Lesse, they're the greatest.

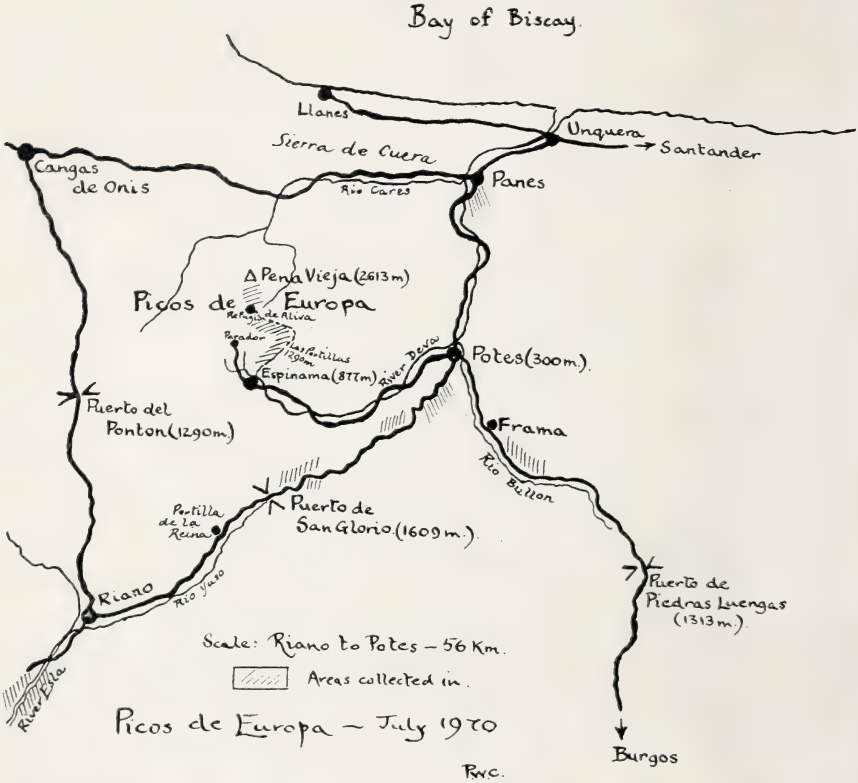
You know, I never did find out why there are no young entomologists in Northern Ireland, Scotland or Wales.

H. J. Berman (2941)

EXPEDITION TO SPAIN—JULY, 1970

My previous trip to Spain, in 1968 with W. L. Coleridge, had been in early July and we had missed some of the rather special butterflies which are on the wing later in the month. We had also wanted to visit the Asturian Mountains but had opted for the National Park of Ordesa for our second week. Our appetite had been whetted by the wealth of insects, and the weather and the countryside made another trip an attractive proposition. With some very helpful advice from Lt.-Col. W. Manley we decided to make a further sortie in the second half of July, 1970. We comprised of Coleridge and myself and another member, Alan Waters. Coleridge again generously supplied the transport in the form of a Ford GT Cortina and we met on the 9th July at Southampton Docks where we drove onto the SS Patricia of the Swedish Lloyd line. We had a three berth cabin and enjoyed a very smooth passage of 36 hours to Bilbao, killing time by watching clay pigeon shooting, eating very good food in the cafeteria and watching the sea go by. We arrived at Bilbao in a seat mist at 7.30 a.m. on the 11th and drove straight off the boat towards Santander. The road leads along the cliffs overlooking the Bay of Biscay through such excitingly named townships as Laredo. We by-passed Santander and drove on to Unquera where we turned south into the Asturian Mountains, part of the range which the Romans named Montes Cantabricae. We had been unable to book accommodation in advance so made good time, stopping only once on the roadside for a snack and a brief look around. This was as we came to the foothills of the mountains.

Alongside the road we found many interesting butterflies on the wing: the Lulworth Skipper, *Thymelicus actaeon* Rott., and Essex Skipper, *Adopaea lineola* Ochs.; the Bath White, *Pontia daplidice* Linn., the Hairstreaks, *Strymonidia ilicis* Esp. and *Laeosopis roboris* Esp.; Meadow Browns, *Maniola jurtina* Linn., *Pyronia tithonus* Linn., *Coenonympha arcania* Linn. and *C. pamphilus* Linn. Alan found a batch of eggs of the Black-veined White, *Aporia crataegi* Linn., on Sloe bushes around which were flying both *Gonepteryx rhamni* Linn. and *G. cleopatra,* both newly emerged. The Fritillaries included *Argynnis paphia* Linn., *Mellicta athalia* Rott. and *Clossiana dia* Linn. There were several specimens of the Short-tailed Blue, *Everes argiades* Pall., and I also took one Long-tailed Blue, *Lampides boeticus* Linn. The dark form of the Marbled White was flying on the grassy slopes, *Melanargia galathea f. procida* Hbst. The orange form of *Pararge aegeria* Linn. was also along the hedgerows and migrating specimens of *Colias crocea* Geof. and *Pieris brassicae* Linn. flew down the roadway and up the slopes. We saw several Black Kites and an unidentified Buzzard. Reaching Potes at the foot of the Picos de Europa we decided to drive on up towards the Picos in search of a hostel. The Picos are a breath-taking sight—bare crags standing like a prehistoric monster's vertebrae across the skyline, grey and still blotched with the white of the winter snows, still the haunt of



bears and wild mountain goats. The narrow road above Potes winds up through the lower mountains, along the edge of the River Deva, which rushes down towards the Atlantic, to the village of Espinama. In the village a rough track leads up towards the Picos to Aliva where there is a Refugio. We decided to attempt this track which was marked as suitable for Land Rovers although the incline was given as 25 per cent. After about a mile's slow drive, navigating great ruts and rocks in the pathway, we came to a slope like the roof of a house and the car just would not take it. We managed to turn round and the crawl down was more nerve-racking than the climb. The brakes held all right but the wheels slipped on the loose rocky surface. Regaining the village we drove back to Potes and found rooms in a hostel in the town, the Hostal Casa Cabo. The place was very simple but clean and the food plain and sufficient. Before dinner we had a short trip up the road leading over the mountains to Riano and stopped about half-way up the Pass of San Glorio where we had a look around. I found the Long-tailed Blue flying by the roadside where the foodplant appeared to be the Broom (*Cytisus* sp.) which covers the middle slopes of the mountains in the area. On the following morning the sun shone and we drove off again up the San

Glorio almost to the top of the Pass (1,608 metres) and stopped by the roadside where the Broom was still in flower. It stretched like a long yellow belt at this altitude across the face of the slopes with the wooded valleys below and the rocky peaks above. This is the home of the world's largest species of Erebia, *E. palarica* Chapman, which flies in amongst the Broom and uses the grasses growing there as a foodplant. The butterflies fly out along the edge of the Broom and we were able then to capture them. The majority were past their best but during the day we were able to secure short series of perfect specimens. There were also a few very worn *Erebia triaria* de Prun. flying with them. Along the grassy clearings among the Broom there were many other butterflies on the wing and I found Queen of Spain Fritillaries, *Issoria lathonia* Linn., emerging and drying their wings and was able to photograph them. As we sat eating our lunch we were able to watch two eagles hunting along the slopes above us, one appearing to be a young bird. Cattle also were grazing above, near the rocks. By one of the streams trickling down towards the Pass I found a Cruciferous plant on which were feeding several larvae of the Bath White. The form of the Purple-edged Copper, (*P. hippothoë* Linn) flying here was unusually marked with black spots on the upper side and among the insects of interest were *Plebicula dorylas* Schiff., *Glaucopsyche melanops* Bdv. and the Marsh Fritillary, *Euphydryas aurinia* Rott., the form being similar to our native form. Both *Melanargia galathea* and *M. lachesis* Hbn. occurred here, while at Potes we only found *M. galathea*. We went down into the valley in the fields around Potes and found them alive with butterflies. *G. cleopatra* was very common and Alan took a female marked with the orange of the male on the lower wings. *Laeosopis roboris* Esp. flew around the Ash trees and on the Sloes were both *Nordmannia ilicis* and *N. esculi* Hbn. and the smaller Hairstreak *N. acaciae* Fab. sat on every Umbellifer. It was very hot and about 4 p.m. a storm came up and we returned to the village to set and have our evening meal. The Spanish evening meal is very late—about 9.30—and by this time the streets were thronged with people, singing and dancing, with a band in the village square. Fireworks added to the din and it went on into the early hours with everyone apparently enjoying themselves. It seems everybody loves Sunday night (as well as Saturday).

Despite our late night we were up early next morning for an assault on the Picos. We drove up to Espinama again, with the mists lifting from the peaks and the sun beginning to blaze down. Coleridge collected in the area around the village while Alan and I started the climb up to Avila—about 8 kilometres of steady climb over a very rough track with the rocks bouncing the sun back at us. We soon realised that we were lucky to have stopped the car when we did on our previous trip as the road really was bad. A heavy lorry did pass us and left part of its treads on the rocks. The slopes above and below the track were covered with flowers and plenty was on the wing. However we pressed

on until we came to the base of some rocky spurs through which was a sort of gateway called Las Portillas (1,290 metres). There were a few *Parnassius apollo* Linn. flying here and beyond the gap the slopes levelled off a little and below the track ran a stream. All along the edges of the stream and on the wet rocks lying in its bed were swarms of the little Blue, *Agriades pyrenaicus* Bdv. This is a very local butterfly occurring in this range and in the West Pyrenees—whitish blue with very black spots on the underside. After nearly four hours climb we reached the meadows below the Refugio. Here we met our first Erebias, *E. meolans* de Prun., and a few *E. gorge* Hbn. and flying very quickly up and down the slopes *E. cassioides* R. and H. (form *Pseudomurina* de Lesse). They were quite difficult to net and we only took a short series. We spotted eagles circling over the peaks and saw several Black Eared Wheatears among the rocks. At the Refugio we stopped for a well-earned lager before climbing on up the track to the screes below the Pena Vieja (2,163 metres). Here we hoped to get *E. lefebvrei* Bdv. (form *astur*) which flies on these screes but as we reached the snow a great wall of mist crept up behind us from the valleys and as it enveloped us a storm started with a great clap of thunder on the peaks. Soon we could hardly see our way and the rain torrented down. We sheltered for a while and then made our way dejectedly down past the Refugio towards the village. Collecting was now impossible and we at last got down to meet Coleridge at 5.30 p.m. He had had little success round the village as hay-making was in full swing and collecting restricted.

Our trip for the next day was to go over the San Glorio to the town of Riano on the banks of the River Esla. We climbed the pass into thick clouds which enveloped the areas where we had collected two days earlier. The road up to the top of the Pass was metalled and being repaired so that we had to negotiate lorries and tarring machines on the road in addition to the hazard of the swirling mist. From the top we passed into the Department of Leon and the road became a stony track steeply winding down into a great rocky gorge, a dirt road strewn with debris from the slopes above. A series of small villages lie along the way, all villages of the Queen—Llanaves de la Reina, Portilla de la Reina—until we again reached metalled road, long and straight leading into Riano. The town is about the size of Potes and we drove straight through and along the side of the river into another gorge to collect on the slopes on each side of the river. Here the wind was very strong but the sun was shining and soon it became quite hot with only occasional clouds. On one side of the river the slopes were green with grass and clumps of bushes and dwarf Beech. There were a few *Limenitis reducta* Stdgr. in the pathway and *M. galathea* was totally replaced by *M. lachesis*. Several *Coenonympha arcania* Linn. and *C. iphioides* Stdgr. were flying together in the clearings and among the bushes were *L. roboris* and *Strymonidia spini* Schiff., the latter a very beautiful form in the female with the wings almost totally suffused with orange on the upperside. The

Meadow Browns were particularly large and well coloured and *Hyponephele lycaon* Kuhn. were of a form which had a proportion of females with three eyes on the upper wing. The Erebia, *E. meolans bejarensis* Chap., was common on the grassy slopes flying with *Lycaeides ilas* Linn. The opposite slope lay in the full sun and was dry, calcareous and covered with scrub much of which was Sloe, *Prunus spinosa*. Here the fauna was quite different—the Large Blue, *Maculinea arion* Linn., was common and of a large and brilliant form. There were a few *Lysandra coridon asturiensis* Sagarra and I also took one *L. albicans* H.-S. The Coppers, *H. virgaureae* and *H. alciphron gordius* Sulz., were flying along the road, the former being again large and very bright. Coleridge caught a large Grass Snake which was trying to devour a toad and Alan, who had climbed up to the cliffs above the rough slopes, had found some *Parnassius apollo*. There were a lot of *G. rhamni* on the wing but we saw none of *G. cleopatra* which were so common at Potes. There were a few *Coenonympha dorus bieli* Stdgr. on this slope and each Sloe bush had a few *Nordmannia acaciae* Fab. and an occasional batch of eggs of the Black-veined White, *A. crataegi* Linn. This was indeed a wonderful area for butterflies with a wealth of species and a variety of terrain within a fairly small area. Unfortunately it was rather a long way from our base and with the threat of having to drive back through heavy mist we left early and drove back over the mountains.

The next day did not offer much hope as the clouds lay down the slopes into the valleys. We decided to drive southwards to have a look at the Puerto de Piedras Luengas but it soon became clear that collecting at altitude was out, so just beyond Frama we stopped and collected on the slopes by the road. These were wooded opening out into meadows. There were plenty of butterflies on the wing despite the lack of sunshine —*A. paphia* Linn. and *Nymphalis polychloros* Linn. flew in the glades and I took several *Pararge aegeria* Linn. Wood Whites, *Leptidea sinapis* Linn. flitted about and many of the species which we had taken near Potes. Along the paths were growing large clumps of Everlasting Pea, *Lathyrus* sp., and every flower head had a spattering of eggs of the Long-tailed Blue, *Lampides boeticus* Linn., and I captured one or two females in the act of laying. We collected up a lot of the eggs and Alan was able to breed out a series back in England.

Among the grasses I found many specimens of the Lulworth Skipper, *Thymelicus actaeon* Rott., and the Essex Skipper, *T. lineola*. With the weather not improving we returned to Potes and packed ready for an early start on the morrow towards the South, as we had arranged accommodation in the village of Bronchales, high in the Montes Universales, about 30 kilometres from Albarracin and were due to arrive there on the Friday.

to be continued.

BOOK REVIEWS

A Field Guide to the Butterflies of Britain and Europe. L. G. Higgins and N. D. Riley (Collins). 380 pp, 60 Coloured Plates, 371 Maps.

The publication of this long-awaited handbook coincided with our Annual Exhibition and our members were able to buy copies autographed by Brian Hargreaves, the illustrator of the 760 butterflies appreciated when it is realised that the last comparable publication was that of Lang's *European Butterflies* in 1886. The combination of the wide knowledge of Dr Higgins and Mr Riley, both as collectors and as taxonomists, has resulted in what must be a "winner" from the publisher's point of view and the wonderful illustrations by Mr Hargreaves will make the book not only a "must" for every lepidopterist in Europe but also an important reference for all those with a general or holiday interest in the European fauna.

It is a very comprehensive work in that it covers the Butterflies of all Europe, other than the USSR, those of North Africa (Morocco, Algeria and Tunisia) and the Mediterranean and near Atlantic islands. Each species is figured and described and its range, flight times, habitat, food-plant, distribution and sub-species are clearly set out under separate headings. Coloured illustrations, in near perfect colour reproduction, show the upper and underside of all species and at the end of the text are a series of maps indicating the range covered by each. The notes with the illustration are particularly good as they indicate the points of figured in the coloured plates. The importance of the new book will be identification to look for, the page in the text where the full notes may be found and the species and sub-species.

The size of the book is just right for the traveller and its price is within the range of the most modest purse. It has been published in most European languages and undoubtedly its popular appeal has kept the price at a level which is attractive to those with a fringe interest.

In a publication with so much to commend it, it is hard to criticise. There are a few shortcomings. In the preparation of the material for the plates, it is a pity that species, sub-species and closely related species were not always kept together for comparison. I find it a little irritating to have *Lysandra albicana* among the *Pieridae* on plate 13 while I must turn to plate 57 to compare it with allied *Lycaenidae*. There are several examples of this. The greatest disappointment for the serious student is the absence of any diagrams of the genitalia characters used to separate the difficult species. In the closely related *Mellicta* and *Pyrgus* groups the external facies are of little use and while the text refers to the need to use genitalia characteristics in several cases, no information

about them is given. Brief notes and simple sketches of these awkward species would have increased the value of the book inestimably. The information is available from other sources but the Bibliography restricts itself to distribution literature so that there is no guidance as to where to look and my own experience has shown that such sources are difficult to locate and very expensive to obtain. Here was an opportunity to bring the known material together. I suspect that it was omitted in order to avoid making the book appear to be too technical for the beginner.

The maps of distribution are well conceived and very clear but I feel that they should be only taken as a general guide. The authors state that there are imperfections but some seem rather obvious. The distribution of *Melanargia galathea* in Britain is shown as not extending westwards beyond Hampshire yet it is a very common species along the North Devon coast. In Spain and North Italy the ranges indicated are under rather than over estimated. The maps do give, for the first time, a basis for distribution records and future records of species outside the areas shown should be published and forwarded to the Records Centre at Monks Wood.

The scientific nomenclature used in the book is, the authors and all of us hope, likely to be standard from now onwards as it is in accord with that of the International Commission on Zoological Nomenclature. It means that there are further changes in names which we had come to accept—we relearned *Argynnis aglaia* Linn. as *Mesoacidalia charlotta* Haw. but now find it is *Mesoacidalia aglaja* Linn. (despite there being no "j" in Latin). *Colias croceus* Fourcr. becomes *Colias crocea* Geoff., a change of sex as well as author. I hope that all will now adhere to the nomenclature of this book so that the present confusion ceases.

Unfortunately the authors have included English names for all species. This has been done with the obvious intention of appealing to the novice and as an encouragement to the beginner. If it achieves this end I suppose that it is worthwhile but as previous authors have found, the exercise is an unsatisfactory and unhelpful one in the long run. In this case the effort seems to be haphazard and sometimes misleading. The butterfly of South France and Spain, *Tomares ballus*, which I learned as the Green-underwing Copper is here called the Provence Hairstreak, having no apparent affinity with those Hairstreaks we all know and seeming happier among the Coppers.

I feel it was a mistake to try to marry existing English names into their new names where they did not really fit the pattern. All the Erebias have been called Ringlets with the exception of two, the Scotch Argus and the Arran Brown, names which could have been lost or at least had the name Ringlet added to them. The Graylings wander through a range of generic groupings from *Hipparchia, Pseudotergumia, Pseudochazara* to *Oeneis* and then pop up again with the *Berberia, Brintesia* and *Are-*

thusana interrupted on the way by Satyrs, Hermits and a Dryad. In short the patterns are hard to follow, will be difficult to remember and may well confuse. One gets the feeling that they may have been an afterthought, asked for by the publishers.

The Index of scientific names is set out under generic headings so that if one is not sure of the genus, and many have been changed, then some time is lost. The old synonyms are not given and I feel an index with generic and specific names listed alphabetically as well could have been helpful.

However the whole book is of such a standard that it will rank with the best of similar handbooks in the past and Higgins and Riley will become part of the entomological vocabulary along with South, Lang, Buckler and others.

1.11.1970 P. W. C.

Discovering Britain's Butterflies and Moths. David Corke (The Project Club) published by Wolfe Publishing Limited for the Dairy Industry. 63 pp (4 in colour) 30 figs.

This booklet is one of a series of two hundred on a variety of topics. Written by David Corke a former editor of the *Bulletin*, it is a simple but useful introduction to entomology for young beginners. It consists of short practical projects including constructing simple apparatus, observing and making records of living insects. This is not a book for would-be collectors but rather for would-be biologists. All in all well worth 3/- of anyone's pocket money.

J. B.

AES PAMPHLET No. 11

This pamphlet which is a label list of the Butterflies of Europe was compiled in 1966 with the advice of Mr R. F. Bretherton and follows his usage in his Book on the Distribution of European Butterflies. The publication of the new Book by Higgins and Riley, 1970 *A Field Guide to the Butterflies of Britain and Europe* introduces several new species not referred to in the pamphlet and changes many of the names used. In order to bring the Pamphlet No. 11 into line with this new publication, which undoubtedly will become the handbook for most who collect on the Continent, an appendix to the pamphlet has been printed—it consists of two extra pages with some 90 new names. The appendix will be included in all new issues of the Pamphlet and some additional copies have been printed for purchasers of the original. These latter may be obtained from the Publications Agent, Mr L. Christie, on request accompanied by a stamped addressed envelope. It is hoped that this new standard for the nomenclature of our European Butterflies will remain with us for a longer period than its forerunners.

P. W. C.

THE AES ADVISORY PANEL

How and when to consult the Panel

Members of the Panel will advise you on the study of their special groups and will identify small numbers of British specimens which are of particular interest to you. Large collections should be taken to a museum for identification. Try to use a copy of the relevant standard work if you know of one, before approaching the Panel.

Always mention that you are approaching the Adviser as he is a member of the Panel and give your own **Membership number.** You must **enclose postage stamps** to cover the cost of a reply or return of specimens. Members of the Panel are busy people, so try to send dead material to them during the winter when their own time is less likely to be taken up with field work. You are recommended to **send a stamped addressed envelope** for acknowledgement of the receipt of material which may have to await time for its indentification. **Labelling** — with details of locality, foodplant, date, time and mode of capture, etc. — often greatly simplifies identification. Every specimen should be fully labelled on the same pin as bears the specimen or its mount. Details of locality will be treated as confidential if this is desired.

The Society is most grateful to the many specialists who serve on this Panel, without any remuneration other than the occasional specimen taken, with permission, from an interesting series that has been sent in. It is hoped that Advisers on those groups that are noticed incidentally or as pests will be sought after as frequently as members of the Panel willing to identify commonly collected Orders.

New advisers on appropriate subjects not covered below are always welcomed by the Hon. General Secretary.

ADVISORY PANEL

Coleoptera (Beetles)

General advice on identification
D. TOZER (36), 98 Copdale Road, Leicester.

Staphylinidae
H. R. LAST (117), 12 Winckworth Road, Banstead, Surrey.

Water-beetles
Prof. J. W. A. F. BALFOUR-BROWNE, M.A., c/o British Museum (Natural History), Cromwell Road, London, S.W.7.

Dipera (Two-winged Flies)

General advice
L. PARMENTER (895), Woodside, Pinewood Road, Ferndown, Dorset.

Larvae (approximate identification)
K. G. V. SMITH, c/o British Museum (Natural History), Cromwell Road, London, S.W.7.

Tachinidae (Parasitic Flies) *and Muscidae*
E. C. M. FONSECA, 58 Woodstock Road, Redland, Bristol 6.

Tipulidae (Crane-flies)
R. M. PAYNE (2982), Westwood, Highwalls Avenue, Dinas Purvis, Glamorgan.

Ephemeroptera (Mayflies)

General advice and identification of larvae and adults
T. T. MACAN, M.A., Ph.D., Stevney, Outgate, Ambleside, Westmorland.

Heteroptera (Het-bugs)

General advice and identification
T. R. E. SOUTHWOOD, B.Sc., Ph.D., Imperial College Field Station, Silwood Park, Sunninghill, Berkshire.

Aquatic species
T. T. MACAN, address above.

Homoptera

Aphidoidea (Greenflies, Blackflies)
H. L. G. STROYAN, M.A., c/o

Insect Pathology Laboratory, Hatching Green, Harpenden, Hertfordshire.

Auchenorhyncha (Leaf-hoppers, etc.)
Dr W. J. LE QUESNE, Anne Cottage, Lye Green Road, Chesham, Buckhamshire.

Hymenoptera

Aculeata (Bees and Wasps)
J. C. FELTON, 'Beechcroft,' 22 Gore Court Road, Sittingbourne, Kent.

Formicoidea (Ants)
C. A. COLLINGWOOD, B.Sc., c/o National Agricultural Advisory Service, Coley Hill, Reading, Berkshire.

Parasitica (Chalcids, Ichneumons, etc.)
G. J. KERRICH, M.A., c/o British Museum (Natural History), Cromwell Road, London, S.W.7.

Symphyta (Sawflies)
Dr V. H. CHAMBERS, 12 Douglas Road, Harpenden, Hertfordshire.

Lepidoptera (Butterflies and Moths)

'Microlepidoptera' —indentification
S. WAKELY (1860), 26 Finsen Road, London, S.E.5.

ditto — *general advice*
D. OLLEVANT (1514), 3 Salcombe Drive, Morden, Surrey.

Noctuidae and their larvae
B. F. SKINNER (2470), 85 Elder Road, West Norwood, London, S.E.27.

Saturniidae (Silkmoths)
B. O. C. GARDINER (225), 18 Chesterton Hall Crescent, Cambridge.

European Butterflies
P. W. CRIBB (2270), 355 Hounslow Road, Hanworth, Nr Feltham, Middlesex.

Odonata (Dragonflies)

General advice and identification
A. E. GARDNER, 29 Glenfield Road, Banstead, Surrey.

Orthopteroids (Cockroaches, Grasshoppers, Mantids, Earwigs, etc).

General advice and identification of British and imported species
A. E. GARDNER, address above.

Plecoptera (Stoneflies)

General advice and identification of larvae and adults
T. T. MACAN, address above.

Thysanoptera (Thrips)

General advice and identification
T. LEWIS, B.Sc., Ph.D., c/o Rothamsted Experimental Station, Harpenden, Hertfordshire.

Trichoptera (Caddisflies)

General advice and identification
T. T. MACAN, address above.

Insect Migration

Recorder and Adviser
R. A. FRENCH, B.Sc., (2129), Rothamsted Experimental Station, Harpenden, Hertfordshire.

Botany

Identification of foodplants
H. K. AIRY SHAW (545), Royal Botanic Gardens, Kew, Surrey.

Selection, propagation and cultivation of foodplants and floral attractions
R. C. DYSON (91), 58 Stanford Avenue, Brighton 6, Sussex.

Plant Galls
D. LEATHERDALE, Eastfield Lodge, Whitchurch, Nr. Pangbourne, Berkshire.

Apparatus and Techniques (except microscopy)

General advice
M. E. CASTLE (2490), 'Avellana,' 172 Greenfield Crescent, Hazelton Gardens, Horndean, Hampshire.

Microscopy

General Advice
G. W. SWAYNE, A.I.S.T., F.R.M.S. (3949), 22A Thorpe Road, S. Tottenham, London, N.15.

Photography

35mm. still and general advice.
R. W. J. UFFEN (1660), 4 Vaughan Avenue, Stamford Brook, London, W.6.

R. N. BAXTER

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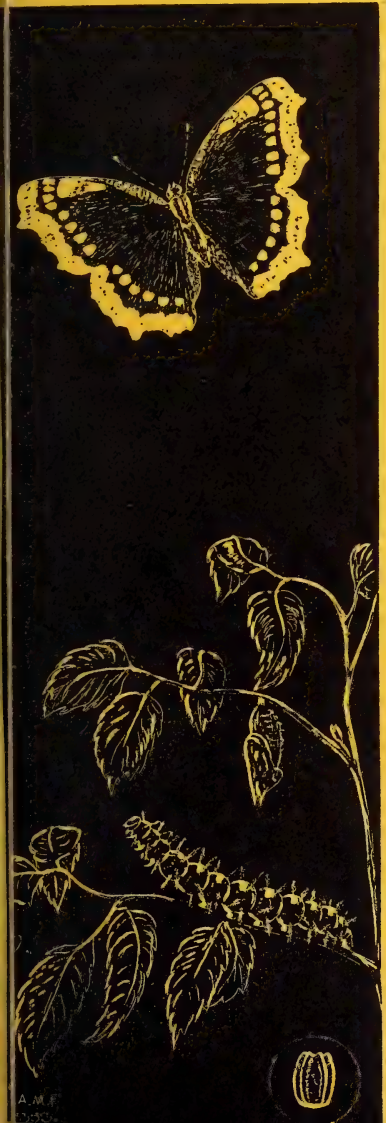

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AES BULLETIN

No. 291
MAY, 1971

EDITORIAL

During the last few weeks I have been pleased with the number of substantial articles that have been coming in. I would however welcome a few more short items which apart from their own intrinsic value help to make the job of editing somewhat easier.

Drosophila melanogaster the fruit fly is an insect which has been coming to my notice rather a lot recently. The TIEG Newsletter in its last issue gave an account of an experiment by one of its young members which it was said showed that *Drosophila* cultures exposed to the emissions of a television set developed higher rates of mutation. Kenneth Mardle (4668) has written to tell me of his interest in making scale models of insects and is hoping to show some models of *Drosophila* at the AES Exhibition to be held at Holland Park School on the twenty-fifth of September.

Discussion on the conservation-collecting issue continues. I have had numerous letters supporting both sides, many of them reiterating previously expressed views. It is my intention to give a summary of these viewpoints in a later issue by which time a statement of AES policy should also be available.

Last year we experimented with a livestock information service which in its small way proved to be quite successful. This year we hope to continue the service expanding it to include a few more of the British species. The people to contact are Mr Brian Wraxall on 01–578 8817 (evenings), myself on 01–464 5990 and Richard Bance at 10 Francis Road, St. Pauls Cray, Orpington, Kent. Please note again we do not want livestock or money sent to us only details of wants and surpluses.

John Bocock (4211)

COLLECTING NOTES—MAY 1971

The Smaller Moths

Mr E. S. Bradford writes as follows of the two species he has drawn: "*Argyresthia glaucinella* Zell. The drawing of this moth is from a number of specimens taken from the trunk of a large oak near my home. Nearly the whole of the trunk of this tree is composed of large burrs with practically no normal bark showing. There is much red frass, or reddish-brown frass on the bole showing the evidence of the larvae feeding within. I have found the moth resting on the trunk towards the end of June.

"The main colour of the forewings is blackish brown. When the light catches them you get a silvery leaden sheen. The head is a creamy white and the hindwings are a brownish grey.

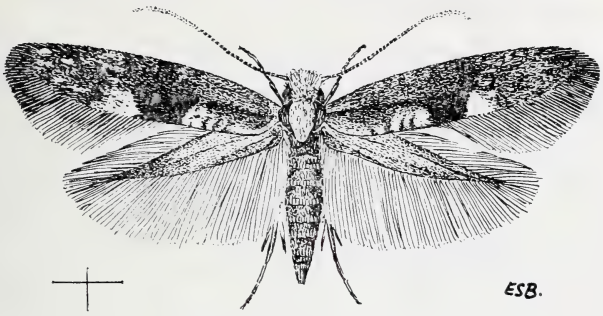
"*Swammerdamia pyrella* Vill. The drawing is from one of several moths reared on apple collected in the garden one autumn. The larva makes many spinnings from one side of the leaf to the other on the upper surface of the leaf. When not feeding it seeks the centre of this filament-like mass and almost seems suspended in mid-air. When full fed, my larvae spun dense white cocoons amongst the leaves in the container in which they were bred. Two of the adult moths emerged on the 25th April, a bit early. There are two broods a year, the adults being on the wing in May and August.

"The forewings have a purplish coppery sheen to them. The main colouring is whitish and black with grey hindwings and the head is whitish and perhaps a little creamy at times."

Besides apple, *S. pyrella* feeds on hawthorn (its commonest food-plant) and cherry. The first generation of larvae is to be found in July.

The "plumes" are a very attractive family of moths and though technically microlepidoptera they are collected by many "macro-men" as well. The following species are amongst those I have reared in recent years from larvae taken in late spring or early summer.

If you visit a saltmarsh at the end of May, you may notice holes or semi-circular chunks bitten out of the leaves of Sea Lavender, *Limonium vulgare* Mill. The larva responsible is that of *Agdistis bennettii* Curt., and it will probably be found resting on the underside of a leaf, with which it harmonises closely in colour. This is a common species on the south and east coasts of England between Hampshire and Durham (Beirne 1952). Its place is taken in the south-west by the far more local *A. staticis* Mill., whose larva is to be sought on the Rock Sea Lavender, *L. binervosum* (G. E. Sm.) C. E. Salmon. Portland Bill is the best known locality for this species. The larvae, which to some extent are gregarious, must be sought on the clumps of the foodplant growing on cliffs, often in precipitous situations.



Argyresthia glaucinella zell.

Swammerdamia pyrella vill.

One of our most interesting plumes is *Buckleria paludum* Zell. which feeds on Sundew, *Drosera rotundifolia* L. This is an entomophagous plant and one wonders how the female moth manages to lay her eggs without being trapped by the sticky red hairs which cover the leaves and then digested by the plant. How, too, do the larvae get away with it? Then there are the parasites. I have had only two larvae of this species and both produced imagines, but I am told that I was lucky, for the majority are stung. One would have expected that the nature of the foodplant would have given complete protection from parasitic enemies. The best way to breed *B. paludum* is to pot up the plants on which the larvae are feeding and then, of course, keep them very well watered. My larvae fed up very slowly. The species occurs with the foodplant as far north as Yorkshire. A rubber mat to kneel on is a help when one is searching on wet ground for the larvae.

Pterophorus galactodactylus Schiff. is a species which I find commonly as a larva, though I have never seen a wild imago. The caterpillars bite round holes in the leaves of burdock, *Arctium* spp., in the spring and rest on the underside of the leaf, with which their colour harmonises so closely that they are almost invisible. [The holes are instantly distinguishable from those made by snails by the residue of felted hair visible from above round the edge of the aperture. R.W.J.U.] As the leaves grow bigger, the larvae desert them for younger and tenderer growth. Finally they pupate equally invisibly beside a rib. The species is common in open woods in the south of England. Far more local is its relative *P. spilodactylus* Curt., for its range is limited to that of its foodplant, White Horehound, *Marrubium vulgare* L. This grows mainly on chalky soils and the downs of the Isle of Wight are a well known locality for the plant and moth. I shall never forget collecting it there close to the edge of the cliffs with Mr S. Wakely. In his advancing years Mr Wakely is distinctly unsteady on his feet, especially when he first rises after crouching low over a foodplant. He staggers backwards half a dozen paces before he can regain his equilibrium, and that was just about his distance from 300 feet of verticality! Another haunt of *P. spilodactylus* is the Great Orme in North Wales, and between these places it occurs very locally inland; it has also been recorded from Suffolk.

Chalk downs are also the habitat of *Leioptilus carphodactylus* Hübn., which feeds on Ploughman's Spikenard, *Inula conyza* DC. There are two broods of larvae, the first of which feeds in May on the tender heart of the young plant. The best plan for breeding the moth is to dig up and pot the plants on which they occur. The second generation feeds in the flowers. The species seems to be spreading and it is now not uncommon in many localities from Kent to Dorset.

A second plume on the same plant is *Oidaematophorus lithodactylus* Treits., but its larvae will be found under the leaves. I have had *carphodactylus* and *lithodactylus* together on the same plant, but the latter is, in my experience, more numerous on Fleabane, *Pulicaria dysenterica* (L.) Bernh. I have taken it in Kent and the west of Ireland, and it is locally common between these extremes.

Leioptilus tephradactylus Hübn. is more of a woodland species whose larva eats holes in the young leaves of Golden Rod, *Solidago virgaurea* L. Between meals it rests on the underside of the leaves where it is well camouflaged by its coloration. A third member of the genus, *L. lienigianus* Zell. is best sought in coastal situations in south-east England. It feeds on Mugwort *Artemisia vulgaris* L. in spun leaves where white blotches tend to betray its presence.

A. M. Emmet (1379)

THE PARASITES OF BRITISH LEPIDOPTERA

I should like to say something on the parasitic relations of British Lepidoptera. I do so with the aim not of adding to the current state of observation upon the subject but merely with the aim of presenting, within the confines of a page or two, some facts upon the subject.

1. What is a parasite? A parasite is a carnivore feeding upon the flesh and other tissues of animals.

The body of carnivores consists of three sub-groups: (a) blood-suckers, which occasionally feed upon the blood of other animals; (b) predators, which hunt down and devour their prey performing this act many times during the course of their lives; (c) parasites. Parasites are believed to have evolved from predators and in certain cases there is little to distinguish the two. Basically, however, they are two different forms of carnivore. Rarely do parasites devour their host but simply live at the expense of a single animal, offering nothing in return. Parasites are often categorised into true parasites, parasitoids and hyperparasites. True parasites are rarely fatal to the host—they suck the blood or other tissues but rarely go so far as to kill the host. The host is usually a bird or a mammal and so inevitably is much larger than the parasite. A single host may support a number of individual parasites and may eventually develop a tolerance to them. True parasites are for the most part external parasites, that is, they live on the outside of their hosts' bodies. They tend to be tough-skinned which often proves a valuable asset in assisting the insect to prolong its hold upon the host. They have long claws which enables them to cling more effectively and in many cases they have completely lost their wings. Such true parasites include Lice and Bed-bugs.

Parasitoids, on the other hand are very different, and include such examples as Ichneumon-flies and Chalcid-wasps. They only lead a parasitic life in the larval stage and in the adult state are free-living insects with no parasitic tendencies. The host is small—usually another insect. They usually begin by feeding on the blood or other body fluids but eventually they will devour other tissues and bring about the death of their hosts. Initially, they avoid injury to the vital organs—for example, the viscera—it is only when development is almost complete that essential organs are consumed. Not all parasitoids, however, develop within the body of the host. Some of them cling to the outside, holding on by means of their mouth parts which perforate the skin. By sucking their victim's blood they obtain all the nourishment they require. The Ichneumon-fly, *Rhyssa persuasoria,* behaves in this fashion.

Hyperparasites are parasites of parasites. A primary parasite such as *Apanteles glomeratus* is by no means safe simply because it is concealed within the body of its caterpillar host. The small Ichneumon-fly, *Hemiteles fulvipes,* parasitises the larvae of *Apanteles* and is instrumental

in piercing the skin of the caterpillar to reach them with its ovipositor. *Hemiteles* is thus a hyperparasite.

2. The parasite relations of British butterflies and moths belong to two orders only: Diptera and Hymenoptera; thus they are entirely parasitoids. Lepidoptera are affected in any stage from the egg upwards and there are few species which are not affected in some way or another. What are termed Hymenopterous "flies" are not true flies. True flies belong to the order Diptera and are distinguished by having only one pair of wings (the forewings) complete and ready for flight. The hind wings are modified into knobbed balancing organs called halteres.

(i) Dipterous parasites belong mainly to the family *Tachinidae*. This family consists of thick-set bristly flies for example, *Phryxe vulgaris*, and in appearance the smaller kinds are very similar to house-flies. H. Audcent in 1942 recorded Tachinids in twenty-nine species of our butterflies, but they most often attack the caterpillars of moths. W. R. Thompson has shown that there is no common characteristic to all the hosts selected by the Tachinids, for example, the species *Compsilura concinnata* parasitises the caterpillars of at least eighteen families. Characteristics such as hairiness, feeding habits, whether solitary or gregarious, odour are in no way common to all the hosts selected by the Tachinids but many Tachinid-flies tend to limit the range of their hosts. Over the whole range of insect life, Tachinids behave in approximately five distinct ways: (a) the eggs or newly hatched larvae are attached to the skin of the host insect. The larvae then bore their way into the interior of the hosts' body where they live by consuming the blood, fat-body and later on the more vital organs of the body. *Phryxe vulgaris* behaves in this manner, being a common parasite of *Pieris brassicae* Linn.; (b) the female may by means of a piercing ovipositor perforate the skin of the host and so deposit an egg or a larva in its interior. *Compsilura concinnata* behaves in this manner; (c) the eggs may be laid on a suitable plant and the larvae may then attach themselves to the skin of a passing caterpillar into which they burrow or (d) alternatively, the larvae may seek out a suitable host and upon finding such a caterpillar will then bore into the interior; (e) a few Tachinids lay minute eggs on the foodplant of the caterpillar which are then swallowed with its food. *Sturmia sericariae* parasitise Saturniidae in this manner.

(ii) Hymenopterous parasites belong to two main groups: (a) the super family *Ichneumonoidea* Ichneumon-flies and (b) the super-family *Chalcidoidea* (Chalcid-wasps), along with their allies. Ichneumon-flies are further sub-divided into true-Ichneumon-flies family *Ichneumonidae* and supplementary Ichneumon flies family *Braconidae*. They are distinguished by the neuration of the fore-wings. In the Ichneumonidae, the third discoidal and the second apical cells are separate; in the *Braconidae* in a bag, is to go back for an instant to childhood days. To know that they are united.

C. Morley and W. Rait-Smith (1933) recorded Ichneumon-flies in thirty-two British butterflies, the Ichneumons so discovered belonging to 64 species included in thirty genera. The female Ichneumon usually injects her eggs into the young caterpillar host by means of a piercing ovipositor. Occasionally, the eggs may be laid on the leaves of the hosts' foodplant and the young larvae on hatching seek out their victims and burrow into them. They will then develop internally in accordance with the general pattern. Alernatively, the eggs may be laid on the skin of the caterpillar and the hatching grubs will then burrow into the host. Although development is internal in every case, different species may pupate within the body of the caterpillar which then fails to metamorphose or within the shell of the butterfly's chrysalis or they may pupate externally.

The commonest Ichneumon-fly is perhaps *Apanteles glomeratus* of the family *Braconidae* which infests the caterpillars of the *Pieridae,* especially *Pieris brassicae* Linn., of which it destroys large numbers, and *Pieris rapae* Linn. to a lesser extent. It is extremely small in relation to the size of the caterpillar and so many dozens are able to live within the body of a single caterpillar. The female *Apanteles* will deposit her eggs within the body of the young caterpillar by means of her piercing ovipositor. They feed upon the host's fat-body being careful to avoid the vital organs and remain within the caterpillar until it has spun its silken pad which would normally serve to support the chrysalis. The grubs then gnaw their way through the skin. The caterpillar never completes its metamorphosis; it dies and the grubs spin their cocoons around the corpse of their victim. J. E. Moss (1933) observed that approximately 84 per cent of caterpillars of *Pieris brassicae* Linn. die as a result of the activities of *Apanteles.*

Another Ichneumon-fly, *Apechthis compunctor,* much larger than *Apanteles,* also causes considerable mortality.

Braconidae have been recorded in eighteen species of British butterflies, the parasites so recorded belonging to seven genera and twenty-six species (nineteen of which are included in the genus *Apanteles*).

Chalcid-wasps differ considerably in appearance from Ichneumon-flies. They are smaller, stouter, display more colouration than Ichneumons and have a much reduced neuration. The venation is reduced to a single vein along the front margin of each wing. They infest numerous moths, attacking the eggs, the larvae or the pupae. Morley and Rait-Smith 1933 record them in only four species of British butterfly (that is, *Aglais urticae* Linn., *Pieris brassicae* Linn., *P. rapae* Linn., and *P. napi* Linn.) but it is generally believed that they are much more widespread.

Pteromalus puparum specialises in attacking the pupae of *Pieris brassicae* Linn. It never attacks the caterpillar and upon locating a caterpillar which it judges to be close to pupation will wait, perhaps for several hours, until the process is complete before attacking. The

female then mounts the pupa and injects a number of eggs into the pupa which develop internally within the chrysalis. Chalcids of the genus *Trichogramma* parasitise the eggs of numerous species of moths.*Trichogramma evanescens* is an example. Other chalcids include*Pteromalus imbutus* and *Tetrastichus microgastri.*

3. Breathing apparatus. Parasites that live within the body of their hosts and thus are immersed in the blood of their hosts cannot breathe by any method of breathing pores. The hosts' blood however contains dissolved oxygen and by breathing this through the skin in a fashion similar to that of many aquatic insects the parasites' needs are satisfied. The grubs of the Tachinid-flies, however, sooner or later require to breath fresh air. By boring through the skin of the caterpillar or by gnawing into one of its respiratory tubes and then inserting its tail end containing its breathing pores into the wound, this object is achieved.

Parasites that live on the outside of the bodies of their hosts breathe by means of breathing pores along the sides of their bodies, that is, in the normal manner of an insect.

4. The economic significance of parasites. Despite their grace and beauty, Lepidoptera do considerable damage to agricultural crops; the most potent example perhaps being that of the Large White *Pieris brassicae* Linn. and the damage it causes to crops of cabbages. The economic advantages to be derived from the control of such species through the spread of their attendant parasites has not yet been fully studied. Different methods of control utilising chemical agencies have achieved a greater vogue in recent years. But it seems obvious that at least a reinforcing effect is possible. In other countries, considerable success has been achieved by the use of parasites to control Lepidoptera. For example, in New Zealand, the Small White *Pieris rapae* Linn,, after its accidental introduction in 1929, caused considerable damage to vegetable crops. However, the Chalcid *Pteromalus puparum,* has, in a very short space of time, brought it under control. Considerable possibilities, however, still exist both in this country and elsewhere.

Michael Coleman (4187)

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ARGEMA MITTREI

This magnificent Comet Moth is a native of Madagascar where it is known to be bred for a very profitable tourist market. It is imported mainly by continental dealers at prices approximately half those of dealers in this country. Unfortunately supplies are not always reliable but have been quite good this year (1970).

The literature on the species is sparse. Its native foodplant has not been disclosed although it must be well known to a number of people. Villiard 1970 quotes several people in the USA who have succeeded in rearing the larvae on a variety of indigenous plants including Dwarf Sumac *Rhus cupallina,* Staghorn Sumac *Rhus typhina,* and the Pepper Tree *Schinus molle.* It is also reputed to have been reared on Poison Ivy *Rhus toxicodendron* and by the London Zoo on Walnut *Juglans nigra,* but only to the fourth instar.

For some time cocoons have been bought by breeders in this country, often after having passed through the hands of several dealers *en route.* The emergence rate for these cocoons has been poor and non-emergence or crippled emergence has been more often than not the case.

In an attempt to gain some basic information on this species a dozen cocoons were bought from a French importer ex Madagascar. Initial experiments involved simulating conditions found in the sub-tropical areas of the island.

An adult female moth may have a body two inches long and an inch in diameter requiring a caterpillar of about five inches long with a similar body diameter. It is unlikely that such a caterpillar could reach such dimensions except under conditions of high humidity. The pendant cocoon is a single structure formed of silvery white silk and is perforate. It is rounded at its lower end and contains a one way emergence trap at its upper pointed end. The pupa is visible through the perforations. A cocoon structure such as this suggests an adaptation to conditions of torrential rain where free drainage is essential if the cocoon is to avoid becoming waterlogged.

Since the cocoons had become available in June we assumed they had pupated within the previous month and had possibly been larvae for two months before that. With the further assumption of a two to three week incubation period for the eggs we arrived at a possible emergence and mating date around early March. We had no information as to whether this species was normally single brooded, double brooded or continuously brooded. We also had no information on diapause in this species.

The climatic data on which our incubation regime was based was

as follows:

Tananarive 4500 feet, Subtropical Wet and Dry Monsoon Climate

	J	F	M	A	M	J	J	A	S	O	N	D
°F	70	69.5	69.5	67	63.5	59.5	58	59	62.5	67	69.5	70
Inches of rain	11.8	11	7	2.1	0.7	0.3	0.3	0.4	0.7	2.4	5.3	11.3

We suspected the moth inhabited the monsoon forest region for reasons previously stated. A further lead was provided by the film "*Zoo Quest to Madagascar*" by David Attenborough which showed the emergence of a pair of the moths. The film was shot about one hundred miles to the north of Tananarive and also showed a cocoon being removed from a low growing shrub with a large leaf superficially resembling that of a long pinate *Rhus* leaf. However having discussed this with Peter Taylor of the Kew Herbarium, our AES Council Chairman, it appears that the species of the genus *Rhus* native to Madagascar are atypical, of this widely distributed group of plants in having trifoliate leaves. We are therefore little wiser as to the identity of this plant.

The first moth emerged after about two weeks of incubation, the remainder emerged over a period of five weeks one being crippled. Two of the cocoons failed to hatch, the pupae going soft as in a virus infection. Most of the moths emerged in the morning shortly after the beginning of the ten hour light period. Two of the cocoons were irradiated with short bursts of intense UV light following the technique of J. Bijok as quoted by Villiard 1970. The moths that subsequently emerged did so at an interval of more than a week their development obviously not having been synchronised.

We were not fortunate enough to have male and female moths out at the same time, and have not yet been able to observe mating. One female did produce several ova each four millimetres in length and of a light brown colour but none hatched. Mr Stewart of Canterbury we gather had a similar experience and having put the supposedly infertile ova aside, discovered a few weeks later some young dried larvae that had apparently hatched from these eggs. This would prove no more than that parthenogenesis occurs within this species as it does to a small extent with other Saturniids. It would be of interest to know how significant this mode of reproduction is to the species.

We are hoping to continue our study of this insect this coming season but are faced with the problem of either delaying emergence, growing the substitute foodplant *Rhus toxicodendron* out of season or alternatively producing an artificial diet. To date we know of no artificial

diet incorporating this plant. Experiments with diets incorporating the Stinging Nettle *Urtica dioca* L. another urticaceous though unrelated species have proved unsuccessful when tried with other species of Lepidoptera.

We would be interested to know of any other sources of information or experiences of other members relating to this species or its mainland relative *Argema mimosae.*

J. Bocock (4211) D. J. Driscoll (4305)

●

A COLONY OF MYRMICA SCABRINODIS NYLANDER (HYMENOPTERA: FORMICIDAE)

CONTAINING TWENTY-FOUR QUEENS

I thought it might be of interest to note the following observations on a nest of *Myrmica scabrinodis* Nylander. The nest was found by myself and a friend, S. D. Mackey, in a small, south-facing bank in a field at Boreham Wood, Hertfordshire, on the 7th September, 1970. Although small, the nest was not outwardly unusual, but on excavation and examination, the colony was found to contain seventeen queens, all of a small size; a second visit the following day revealed seven more, making a total of no less than twenty-four. For this large number of queens (in my experience, unusual for this species), the number of workers was relatively small, and brood was scarce. In fact, until positive identification of *M. scabrinodis* was reached, using Collingwood (1964), it was believed that the ants might be *Myrmica ruginodis* Nylander var. *microgyna* Brian and Brian, a polygynous form commonly having such large numbers of queens.

Six of the queens, and some workers, were used to set up a small observation nest, which at the time of writing (mid-February, 1971), is just emerging from a state of semi-hibernation.

P. J. Attewell (5396J)

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SO YOU WANT TO STUDY BEETLES

PART II—SOME PHYTOPHAGOUS BEETLES

By now the leaves on the trees should be well out and high summer upon us. Since it is our purpose to study rather than collect beetles, in this article. I am going to write about phytophagous beetles, many of which can be reared much in the same way as can Lepidoptera. If we are going to study the life histories of some of these beetles it is advisable to carry out a pilot rearing the first season, noting when the beetles lay eggs, when they emerge and when they pupate. During this season preparations should be made to have potted plants available for the following year. The names used for Coleoptera are taken from Fowler and those for plants from Hayward.

Larvae can of course be reared in breeding cages as are Lepidoptera or even in jam jars if they are kept in a cool place out of the sun and cleaned out and given fresh food daily. However, unlike those of lepidoptera most phytophagous Coleoptera larvae are somewhat sluggish and will die if they are not transferred to the fresh food, so for proper study the whole life history should be observed on a growing plant. As the fully grown larvae can feed most voraciously, only a relatively few young larvae should be placed on each plant so that there is sufficient food for them to complete their metamorphosis. Many phytophagous beetles are large enough and brightly coloured so you often do not need to use a sweep net or beating tray to discover them. Further they are often in very great numbers. Last summer in a small field in South Wales I came across *Gastroidea viridula* Deg. for the first time; the area was well under half an acre but a rough calculation showed that there were at least half a million adult beetles and larvae present. It was in fact quite clear that the number was far higher than the *Rumex* plants available could support. I was only on a short visit in the area so that I was unable to determine what eventually happened. Did large numbers of larvae perish through lack of food or did a mass migration of adults occur before this and if so under what circumstances? These are questions that can only be answered by field observations. So whenever possible, breeding in the laboratory or garden shed should be supplemented by careful and frequent observation in the natural habitat. One word of warning: if you do not use potted plants then try to stand your foodplants in water, they last longer and keep fresh. Great care must be taken to prevent the larvae crawling down the plant stems into the water; this can usually be achieved by plugging any spaces of the neck of the vase. I have found old glass cream bottles most useful for standing foodplants in water, they hold a reasonable supply of water whilst remaining short enough for them and their contents to fit easily into the breeding container.

For successful breeding, food should be changed daily and frass and debris removed at the same time. Larvae must be placed on the new food supply. This can be conveniently done by cutting of the stem or portion of the old leaf on which the larvae are resting removing as much of the old plant as possible and wedging the remaining small portion holding the larvae in a convenient place on the fresh food. This ensures that the larvae are disturbed as little as possible and cuts the chance of accidental injury to a minimum. I have found the best way to remove frass and to keep the cage clean is to cover the bottom with a double layer of old newspaper and place a thin layer of dry clean soil or better, sand, on this. The newspaper plus soil is easily removed and thrown away daily. Before use, foodplants should be carefully examined for the presence of spiders, parasites and other injurious inhabitants and these removed. If the plants are covered with honeydew, soot or dirt, they can be carefully washed and allowed to dry. For successful breeding these precautions should be followed carefully. Often in breeding Lepidoptera one "gets away" with much less hygienic conditions than I have suggested but experience has convinced me that larvae of orders other than Lepidoptera are often much less robust than the familiar caterpillar. The procedure I suggest is one I found necessary. No doubt the reader will learn by experience other methods, and devise particular techniques to deal with particular circumstances, as his experience grows. All that can be done in this series of articles is to suggest basic principles to follow. Every breeding experiment is likely to bring its problems and these can only be solved on the spot.

One final warning, do not try to rear too many larvae at once. Remember that the greater the number of larvae, the greater the amount of food that will be required, and the more work there will be in just attending to them. Far better to rear six to twelve larvae successfully with plenty of time for observation than to have a hundred larvae and only rear ten. I try to feed my larvae at different times so that they can be observed at various times of the day at a period when they have been free from disturbance for some time. Do not leave cages in the hot sun as this will cause larvae to sweat which often leads to fungal disease. To observe larvae in the sun you should remove the plant from the cage.

Should your larvae be, or become parasitised do not give up in disgust, the observation of behaviour under these circumstances and of the parasite itself could be much more valuable than those originally intended.

Phytophagous larvae are in the main of the suborder *Phytophaga* but a number of the *Curculionidae* are also phytophagous. It is obviously impossible to mention all the beetles concerned but in the following paragraphs are a number of beetles that are not to difficult to find and which should be fairly easy to rear. If possible take about two pairs in

copulation, you are then certain to have both males and females.

Bruchidae. The larvae of these little beetles feed on the seeds of *Leguminosae*. Garden Peas and Beans are sometimes infested. However since they feed on the inside of pods they may be difficult to observe. It is suggested that opening the pod and flattening it between two sheets of glass may suffice. Pressure on the glass should be sufficient to prevent the larvae escaping easily but not enough to injure or seriously impede larval movement. Such plates should be kept in the dark or in subdued light except for observation.

Zeugophera subspinosa F. This local but not uncommon little beetle can be found on Aspens usually by sweeping or beating. The elytra are black, the head thorax and legs red. The larvae feed openly on the Aspen leaves and should not be difficult to find and rear.

Lema melanopa L. Feeds on grasses and probably on other plants as well. It is usually found by sweeping.

Crioceris lili Scop. This bright red beetle is fairly rare but is well worth breeding if found. It usually feeds on the large white garden lily and in these days of insecticide must be getting rarer.

Crioceris asparagi L. This very beautiful little beetle is quite common wherever there is an asparagus bed. I have never looked at an asparagus bed in June without finding at least a few adults present. The larva feeds on the asparagus fronds and can be a serious pest.

Gastroidea viridula Deg. and *G. polygoni* L. *Viridula* has been referred to earlier. It is a beautiful bright green beetle and can be readily distinguished in the field by the extremely swollen abdomens of the gravid females. *Polygoni* I have never found in such numbers as *viridula*. They both breed on species of *Rumex* and *Polygonae*.

Timarcha tenebricosa F. The large Bloody Nose Beetle so called because of its habit of ejecting a brilliant red fluid from its mouth when alarmed. The beetle is a deep dull blue in colour and is quite common in hedgerows and lanes. It has been recorded as feeding on *Galium* and I have on one occasion found larvae in profusion feeding on *G. mollugo* L.

Timarcha violacoenigra Deg. Very similar to the previous species but only two thirds the size of the first. It is an inhabitant of the chalk downs, although Fowler says Heath and Commons. It probably feeds on species of *Galium*.

Timarcha tenebricosa (F)

Chrysolina banksi (F)

CHRYSOMELA. This genus contains some of our largest and most colourful of our British beetles. It is impossible to indicate more than a few of the commoner species.

Chrysomela banksi F. This ferruginous beetle with a bronze reflection is found in the roots of the foodplant *Ballota nigra* L. in chalky and sandy places.

Chrysomela stapphylea L. This beetle is similar but smaller than the above is generally widespread and common, particularly in damp places. I do not know the foodplant but suspect it will feed on various species of *Plantago*.

Chrysomela polita L. Golden green in colour with elytra reddish brown this beetle is the commonest of the chrysomelids and is found almost everywhere, by sweeping, usually in damp places. I have frequently found it on *Mentha aquatica* and on one occasion found the larvae commonly on *Lythrum salicaria* L. though this may not be its regular foodplant.

Chrysomela varians Scholl. This is a somewhat small oval very convex beetle very variable in colour. It may be coppery with a greenish thorax to metallic green or blue. It is a local species but is often common where it occurs. It feeds on species of *Hypericum* St. Johns Wort.

MELASOMA. There are two species of this genus which are common and it is almost certain that one of them can be found in the readers district. The commonest is *Melasoma populi* L. a large broad convex

species. The thorax and head are a deep bluish-black with the elytra red, narrowly black at the apex of suture. It is found on sallows and young poplars, most often in open country.

Melasoma longicolle Suffr. (*tremulae Step*) is very similar to *populi* but there is no black patch at the apex of the suture. This beetle occurs on aspens and sallows usually in woods. In both species the adults feed heavily on the leaves of the foodplant.

GALERUCELLA. Most of the species of this genus are very common and easy to find. The largest of them *G. viburni* Payk. is found on the guelder rose *Viburnum opulus* and also on the wayfaring tree *Viburnum lantana*. *G. sagittariae* Gill is associated with water plants and *G. tenella* L. with willows.

Of the Sub-order *Rhyncophora* the genus *Cionus* are mostly fairly common and easily found. They are also easy to rear and could be good species to start with. They feed on figwort *Scrophularia* spp. chiefly *S. nodosa* L. and *S. aquatica* L. Both larvae and adults are inconspicuous, they should be looked for, care being taken not to touch the plant as both beetles and larvae drop at the slightest disturbance.

It is to be hoped that the above list will prove sufficient starting points for breeding phytophagous larvae. It will be noted that I have avoided describing larvae or any of their habits. This is because those who breed beetles will come to their observations without preconceived ideas and will thus not miss important details through looking for some expected behaviour. Although larvae have been described and many life histories are known in outline very few if any detailed observations have been made.

It is easy to distinguish coleopterous larvae from other larvae found on plants. The mouth parts are well developed and although thoracic legs are present, abdominal legs are absent, they are usually shiny and the skin tends to be transparent.

In conclusion I will be pleased to answer any queries either directly or in a future article and I hope that not only will some of our readers take up the breeding of Coleoptera but will keep careful notes and ultimately publish them.

B. J. MacNulty (4528)

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HOW—IN BIOLOGY—ONE THING LEADS TO ANOTHER

Just fifty-five years ago—in the year 1916—I was sent out to the West Indies as a young entomologist to investigate a very serious outbreak of insect damage to sugar-cane in the island of Trinidad. The first world war was on and, with no beat-sugar industry in Britain, the supply of sugar from abroad was vital.

The insect in question was a froghopper *Tomaspis saccharina,* and my instructions were to see if any effective parasites could be found in neighbouring countries. As a part of this work I found myself, early in 1917, on the Caribbean coast of Panama, near the Costa Rican border, in an area where bananas were grown on a very large scale for export; but there were also many other crops, including sugar-cane and cocoa.

On the 14th February 1917, after examining some cocoa trees, I wrote in my diary as follows "On the underside of most of the under leaves were numbers of a dark coloured aphis, chiefly apterous females in various stages with a few winged females. On examining a leaf with several hundred aphids on it, I noticed that all the adults were simultaneously moving their bodies up and down at intervals of four or five seconds: and further, that each sudden combined movement made a distinct sound, like a short scrape. The sound was audible at least a foot away from the leaf. I noticed this action on nearly every leaf I watched. Sometimes the coordination was not so good, i.e. half the leaf would move and the other half not—or at a different time, but there is no doubt that the co-ordination is not accidental. Aphids not touching one another still moved together. This is entirely new to me. I know of many insect soloists, but have never yet met an orchestra!"

I had previously seen the same aphis on cocoa near Port Limon in Costa Rica and had not noticed any movement, but my attention had been very casual. About two months later in the same area of Panama I watched a leaf which I had not disturbed in any way on which the aphids were making the same rythmic movement, and saw among them some grubs of a predacious Syrphid fly. Were these the cause of the disturbance? If so, the movements did not appear to have been effective in keeping enemies away.

Shortly after this, I returned to my headquarters in Trinidad and during the next few years I saw and heard on many occasions the same aphis on cocoa leaves making the same movements. On some of the larger rather stiff cocoa leaves the sound was sufficiently resonated to be quite audible a yard or more way. I was able to tell, with my eyes shut, each separate "chirp", which was checked by my wife who continued to watch.

The aphis was identified as *Toxoptera coffeae* Viet. by F. V. Theobald, at that time the British expert on the group.

As I had never before heard of similar movements or sound production in any aphid, I wrote a short account of these observations,

which was published in the Entomologist in 1922.

So a number of years passed.

In 1932 I joined the Staff of Rothamsted Experimental Station in Hertfordshire, and stayed there until my retirement in 1955. A few years after the end of the war a young Entomologist, Victor Eastop, came to work with me and his main interest was in Aphidae. I mentioned to him one day these observations of mine and then forgot about it. But Eastop didn't. He wrote to the College of Agriculture in Trinidad where another old friend of mine, T. W. Kirkpatrick, was Entomologist, and obtained from him some pickled specimens of the cocoa-aphis. Then one day he asked me to his room to see something interesting under his microscope. He had discovered the stridulating organs on these aphis, and there it was for me to see. Later he published a full account of these organs in the Entomologist in 1952.

And so again the years passed.

In October 1968 Eastop and K. M. Harries, Entomologist at the Royal Horticultural Society Garden at Wisley in Surrey, found that this same tropical aphis had been accidentally introduced from abroad to the greenhouses at Wisley, and was doing serious damage to Camellias. In Harries' report of the Plant Pathology Dept. he mentioned this and said that they had on many occasions observed the co-ordinated activity of the aphids and heard the sound so produced.

On reading this report in April 1970 I wrote to Mr Harries and suggested that they should ask Mr W. B. Broughton, who has for many years made a special study of recording and analysing insect song, whether he could tape a recording of the sound produced of our aphis.

This was successfully achieved, and three days before Christmas 1970 I received from Dr Broughton a "tape" with Christmas greetings and the "song of the Aphis" as an accompaniment. I was thus able to hear again the chirps that I had first heard fifty-three years before. It is not everyone who is fortunate enough to have seen—and heard—developments from an accidental observation that he made so long before.

Of course this is only the end of the beginning. Mr. Broughton is hoping to be able to analyse more fully the wave-length composition of the sounds, which will be of great interest. Perhaps it will be possible to get a photo-film of the movements with a simultaneous sound track. Then we want to know if similar movements and sound productions occur in other species of aphis, and of what possible value it is to them. Does it frighten away enemies? How is the co-ordinating ensured? Could sound production be started by playing back to some aphids their own song, or does the vibration have to pass through the leaf? Could one alter their rhythm frequency by playing back the records slower or faster? The more we find out, the more things we want to know!

Jan. 1971 C. B. Williams

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LEPIDOPTERA GENITALIA, A SIMPLE METHOD

Scope. The aim of this article is to provide the field macrolepidopterist with an ultra-simple but self-sufficient guide to preparing genitalia, thus enabling him to separate our critical species.

Apparatus

a x8 hand-lens *or* a microscope
some microscope slide blanks of any thickness
some coverglasses (16mm square or less)
Euparal, 25 ml.
Methylated Spirit ("meths")
Eosin stain, solid or alcoholic solution
a glass egg-cup *or* excavated glass block
caustic soda (sodium hydroxide)
a few long pins
a dropper pipette, e.g. an eye-drops dropper.

Supply of Materials. A convenient supplier is GBI (Labs) Ltd., Heaton Street, Denton, Lancashire, as they supply everything listed above. The overall cost would be around £3.50. They are also the only suppliers of Euparal. Methylated Spirit and caustic soda can also be bought from any chemist's. If you opt for G. T. Gurr Ltd. (Carlisle Road, The Hyde, London, N.W.9), you will have to buy isopropyl alcohol, not meths, as their "Neutral Mounting Medium" (the equivalent of Euparal) is not miscible with household methylated spirit. Worldwide Butterflies Ltd. (Over Compton, Sherborne, Dorset), supply a good and cheap dropper-bottle, also microscope slide blanks, coverglasses (= cover slips), all glass hypodermic syringes and other equipment.

Method

REMOVE THE ABDOMEN FROM THE SPECIMEN. The specimen may be fresh or long set.

PLACE IT IN CAUSTIC SODA SOLUTION. This solution is prepared by adding about a heaped tablespoonful of caustic soda flakes to half a pint of distilled water in a jam jar. Stir to dissolve, and keep the solution in an old washing-up liquid bottle. Remember that this dissolves clothes and skin as well as moth abdomina. Rain water or water from defrosting the refrigerator may be used, but not tap water as this gives a troublesome deposit. Use about a tablespoonful of solution per abdomen, in the glass egg-cup, and leave it there for two days—longer for big abdomina. Make sure the solution has thoroughly wetted the abdomen.

(Three days can be saved by using hot caustic soda solution. Boiling caustic soda in a test-tube is rather hazardous as it is wont to leap out of the tube onto one's hand. With ingenuity one can support a suitable small container in a saucepan with a little water in the bottom. This may

be boiled gently until the softening is complete when the specimen develops a translucent appearance. This will take between five and thirty minutes.)

DISSECT THE ABDOMEN; this need only be done very crudely—in most cases it is sufficient to tear the genitalia into their component parts. A more refined procedure is as follows (see Fig. 1a and following). Remove the abdomen from the solution on the end of a pin, and place it on a slide. It is then held fast against the slide by applying the side of a needle held in the left hand across it. Using the side of a needle held in the right hand, extrude the genitalia, like tooth paste, from the anal end of the abdomen. Still using the sides of the needles, tear the genitalia from the abdominal skin. Similarly, separate the aedoeagus from the claspers. The preparation must be kept covered with liquid at all times, or air bubbles will appear inside the organs. Clean any debris and scales from the genitalia and abdominal skin (if this is to be preserved) by gentle stroking. This is a routine for the male: for the female the process is very much simpler in principle, but it is more difficult to achieve good results. Lay out the abdomen as for the male, and detach the last two segments and the genitalia from the rest of the abdomen. Clean scales from the last two segments and debris from the ovipositor by stroking. If a hyaline coiled cast, the spermataphore, is present in the bursa copulatrix (see Fig. 3a) tear a small hole in the bursa and remove it.

(If you do not want to prepare a permanent specimen, the genitalia may be examined and identified at this point, and the genitalia discarded.)

WASH. Having replaced the caustic soda with plenty of clean tap-water, return the parts to the egg-cup, and leave them there for at least two minutes. Use the tips of the needles to carry them.

STAIN. Draw off all the water with a dropper pipette (or, better, an all-glass hypodermic syringe with the needle removed) and replace it with at least ten ml. (a dessertspoonful) of staining solution. This is prepared by adding solid eosin or alcoholic eosin solution to meths until you obtain a very pale rose pink solution. Ignore the blue colour of the meths. It is better to make this too weak than too strong, since overstaining obscures characters, whereas understaining makes virtually no difference. Leave in the solution for at least five minutes.

MOUNT. Clean a slide, and place two drops of Euparal in the middle of it, or more for big specimens. The drops are conveniently transferred on the end of a matchstick, *not* in the dropper pipette. Take the parts from the stain on the end of a pin. Drain off all the stain by letting them touch paper for a second or so, then immerse them in the drop of Euparal on the slide. Once covered with Euparal, they can be arranged at leisure. Spread the claspers so that their opposed faces lie uppermost. It is best to mount the abdominal skin, when it is needed, with its under-

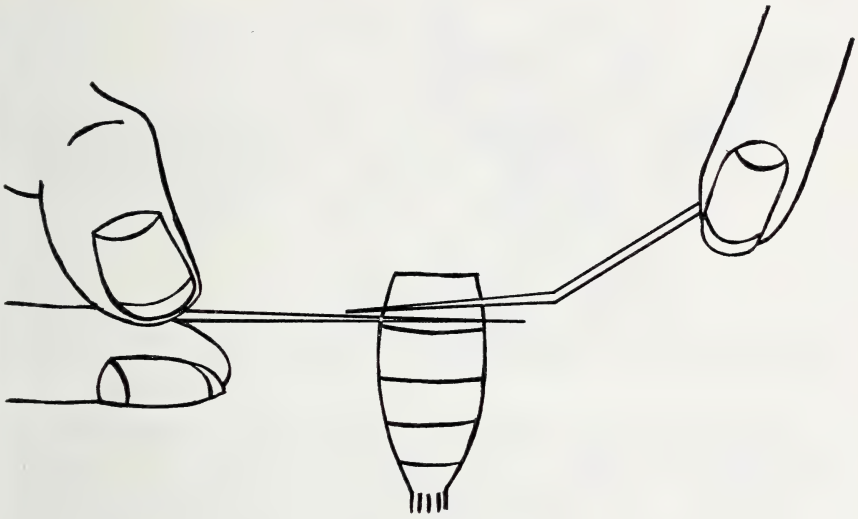

Fig. 1a

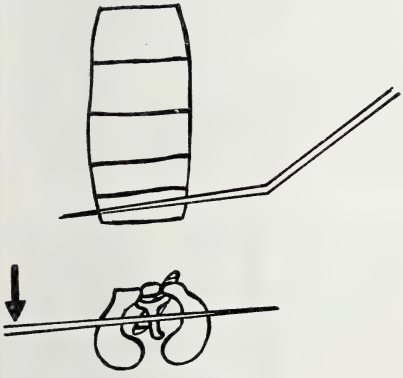

Fig. 1b

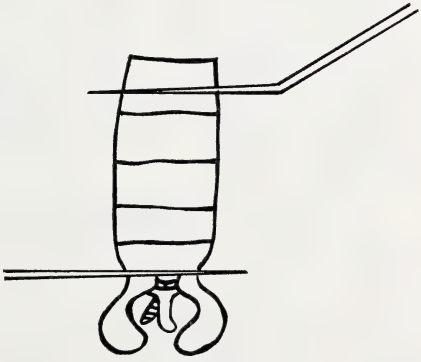

Fig. 1c

side uppermost. If it is a male, don't leave the aedoeagus behind. Now cover the specimen by placing one edge of a cover slip just a fraction from the drop, and, with a pin as support, gradually lower the opposite edge, hinge-like, over the drop. Air bubbles are annoying but not important. The slide should be carefully cross referenced to the specimen and left horizontal and protected from dust. The euparal will not dry thoroughly for several months, but at the end of a week it should be dry enough to allow storage in a slotted slide box, especially if the latter is stored like a book so that the slides are horizontal.

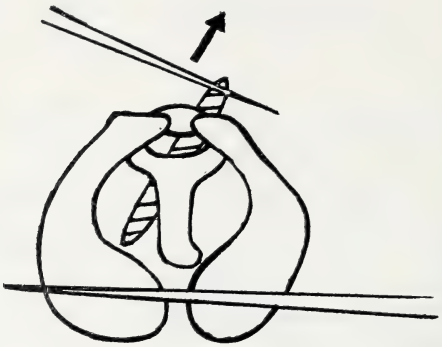

Fig. 1d

GENITALIA IN THE INTACT SPECIMEN. Certain species require examination of the genitalia but dissection is not necessary. For example the two species of Treble-lines: the male Lesser Treble-lines *Anaïtis efformata*, Guen. has short thick claspers whilst the Treble-lines *A. plagiata*, Linn. has long thin ones. The females have equally easy characters. The other simple species are the grey Dagger *Apatele psi*, Linn. and the Dark Dagger *Apatele tridens*, Hubn. (Fig. 4), also the Dusky Brocade *Apamea remissa*, Hubn., Confused *A. furva*, Schiff, and the Crescent-striped *A. oblonga*, Haw. These are all easy enough if the claspers are open. If you always set appropriate specimens with the claspers held wide open with a couple of pins, you will not need to do more than remove a few strategic scales with a fine paint brush before examining them.

If this is not done, you can open the claspers by softening the tip of the abdomen. Apply a little wood naptha to the bases of the claspers either with a paint brush or held by capillary action between the tips of pointed tweezers. Wait for a few minutes and then try opening the claspers by forcing the tips of a pair of pointed tweezers between them and allowing the tips to spring apart slightly. Your chemist may be unable to obtain wood naptha, in which case you may try soapy water, but it will certainly mat the abdominal scales.

Identification and Literature. For unequivocal identification, you will need to prepare slides (the museum jargon is "tails") of about fifteen species of British macrolepidoptera. The only two species for which you need a microscope are the Engrailed and the Small Engrailed *Ectropis bimdularia*, Borkh., and *E. crepuscularia*, Hubn.; for all the rest, a ×8 magnifying glass is adequate. Males of the Minors *Procus* spp., the November Moth group *Oporinia* spp. and the Ear moths *Hydraecia* spp. are all very easy, and Pugs *Eupithecia* spp. are surprisingly simple—and reliable.

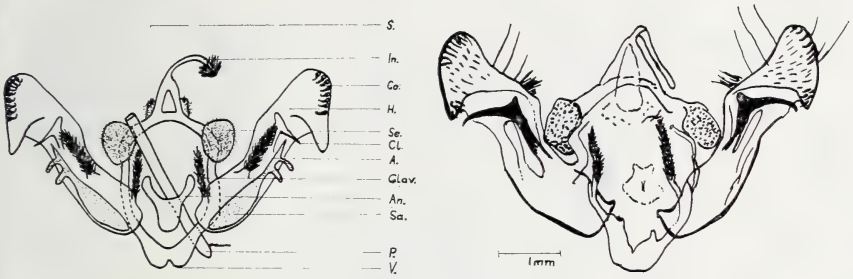

Fig. 2a **Fig. 2b**

Fig. 2a. Schematic male genitalia (with penis in position). *S.*, socium; *In.*, uncus; *Co.*, corona; *H.*, harpe =valvus (clasper); *Se.*, semiculus; *Cl.*, clasper; *A.*, ampulla; *Clav.*, clavus; *An.*, anellus; *Sa.*, saculus; *P.*, penis; *V.*, vinculum.

Fig. 2b. Male genitalia as seen under the microscope. *Hydræcia lucens* Freyer.

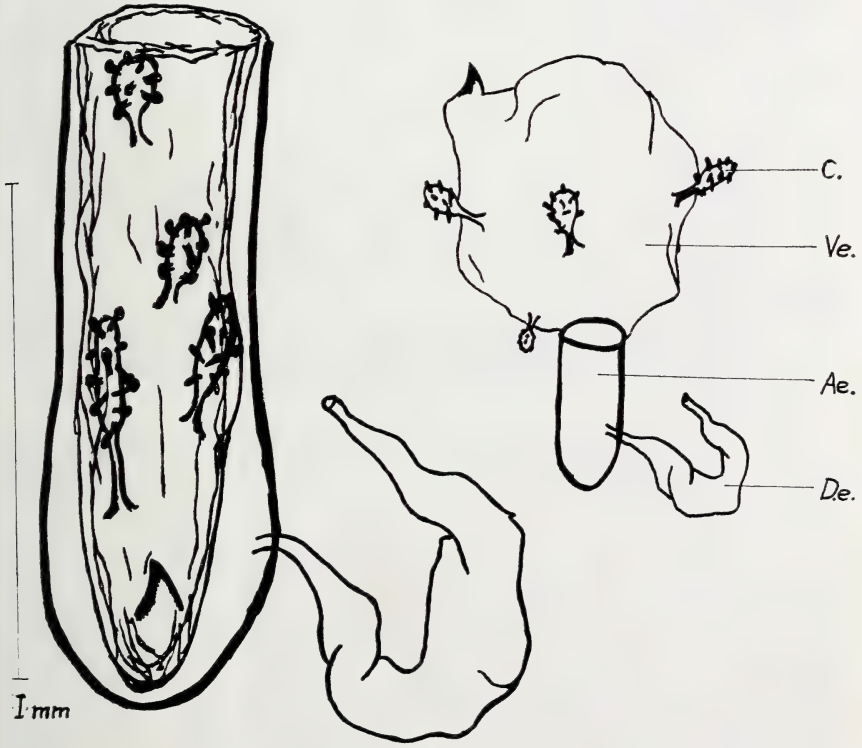

Fig. 2c

Fig. 2c. The penis as seen under the microscope. *Eupithecia satyrata* Hübn.

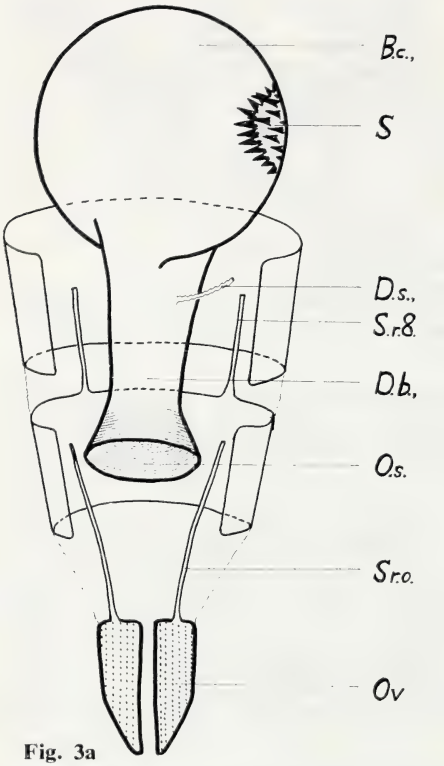

Fig. 3a

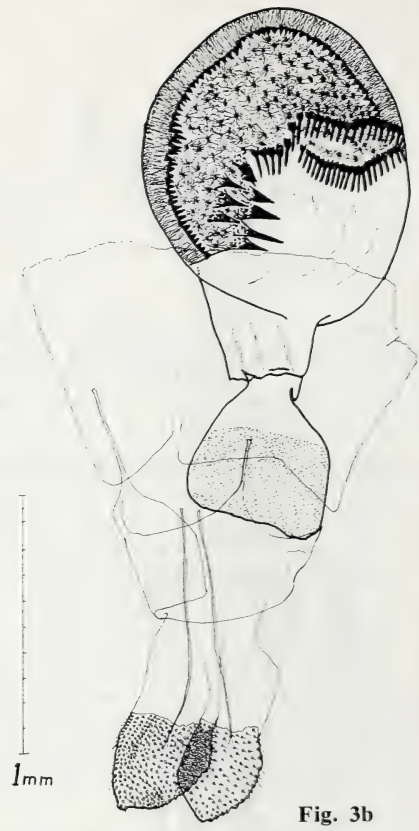

Fig. 3b

Fig. 3a. Schematic female genitalia. *B.c.*, bursa copulatrix; *S.*, signum; *D.s.*, ductus seminalis; *S.r.8*, supporting rod of eighth segment; *D.b.*, ductus bursae; *Os.*, ostium; *S.r.o.*, supporting rod of ovipositor; *Ov.*, ovipositor.

Fig. 3b. Female genitalia as seen under the microscope. *Eupithecia tantillaria* Boisd.

The anatomy of the genitalia is, frankly, not of the simplest, but a few minutes studying Figures 2a and 3a will, I hope, provide rather more than a basic minimum understanding of the structure and the names involved.

As far as literature goes, nearly everything is out of print. Two useful references are readily available. One is the "Keys to Critical Species", produced by the Biological Records Centre, and published in instalments in the Entomologist's Gazette. These have only covered a few selected species. They have also been available as offprints, to those prepared to do a little recording in return, from the Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton, Huntingdonshire. The other reference "in print" is Classey's reprint of Pierce's original volumes "The Genitalia of the Group Noctuidae (etc.) of the British Isles". It is, however, very expensive (up to five pounds a volume)

Fig. 4

Fig. 4. Male genitalia in a very dry specimen viewed from below and behind; the eighth abdominal segment is abnormally narrow due to manipulation. Drawing of *Apatele tridens* with sacculus of *A.psi* inset.

and a little out of date (the Treble-lines *Anaïtis* spp. and the July/Lead Belle group *Ortholitha* spp. are not included). But you need only borrow it to make one or two sketches of the critical species. There are two papers which between them cover all the difficult species. Both are out of print: Classey (1952–3) and Tams (1941)—details are given below. Their text will be found very useful, but the drawings are produced with a different technique of examination in mind; that of examing the genitalia in position in the dry specimen as described above—and this makes them rather confusing. I believe that this technique is, with the exceptions listed, more difficult for the novice than that of preparing mounts on microscope slides. If you have a friend in the Royal Entomological Society, he can borrow these from the Society's library.

For those who want to produce really good slides of genitalia "museum style", an AES leaflet will be published shortly.

I will be delighted to correspond with entomologists interested in starting to use this technique, and to loan example slides.

18.3.1971 Richard Dickson (3674)

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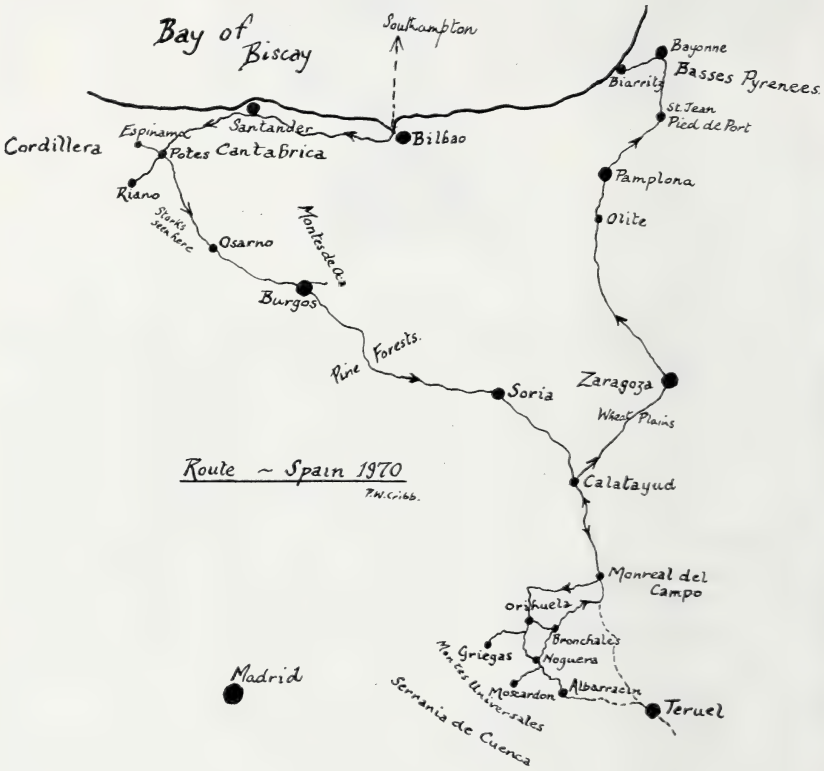
EXPEDITION TO SPAIN—JULY, 1970—continued



On the Thursday we set off again up towards the Puerto de Piedras Lenguas where the sun came out and butterflies skipped along the roadside. Over the pass near Arenos were some marshy meadows by the River Pisuergo and there we saw two White Storks feeding—they looked huge although quite a way off. Later we saw a third sailing high above the road, so graceful on the wing. We also saw several Little Owls on the rocks in the arid places. We at last reached the City of Burgos and drove through its busy streets and beyond to an area where there was an isolated outcrop of limestone rock which Colonel Manley had told us of. It was now very hot but there was a strong wind sweeping along the stony slopes on which grew small patches of a scrubby Oak with leaves like Holly and parched grasses between the rocks. The whole slope was alive with Satyrids—hundreds

of Graylings, *Hipparchia semele* Linn., often in groups of five or six, plenty of very large *Brintesia circe* Fab., some in copula, and skipping over the stones to resettle and disappear into the background were many *Chazara briseis* Linn. The Skippers were represented by *Muschampia proto* Ochs. We had hoped to take *P. apollo* here as it is a very colourful race but we were too late as we took only four and these were well worn. Among the Oaks were a lot of Purple Hairstreaks, freshly emerged, *Quercusia quercus* Linn. At the bottom of the slope where the road ran there was a ditch, the edges of which were lined with a mass of flowers and these swarmed with a great variety of butterflies which had come from heaven knows where. I counted 40 species which included a female *Pandoriana pandora* D. and S., *M. lachesis* and *M. russiae, Pyronia tithonus* Linn. and *P. bathseda* Fab. together. *Agrodiaetus ainsae* Forster (a new species to me) and some very large *Fabriciana adippe* Rott. and *M. aglaia* Linn. Both *L. albicans* H-S. and *L. coridon asturiensis* were on the slopes where I put up a very large hare. Farther along the slopes there were some fairly steep cliffs and I found a large swarm of bees there in a cave and in the stream at the foot of the cliff were several Moor Frogs and some unidentified fish. Alan and I climbed up the slopes in the hope of finding more *P. apollo* and were rewarded by a fine female which subsequently laid a large number of eggs in a muslin covered box in the bedroom. As we had to find a billet for the night we left this exciting area early and drove south through vast Pine forests where logging was in full swing. The Pines were huge and the timber looked of high quality—once we were held up by a street procession which filed in front of us into the village church and at dusk we reached Soria, a fairly large town where we found a hotel, Hotel Perez. The rooms were nice but the food was atrocious and the price was double what we had paid at Potes. As a result of this food we were to suffer some discomfort later. A place to be avoided by others with English stomachs. We were up at 7 a.m. and drove away via Calatayud and Monreal del Campo into the dry wastes south of Zaragoza. Large lizards shot across the road and we saw a family of quail hurry across in front of us. At Monreal del Campo we turned off and took the road to Orihuela de Tremelda, a rough dirt road full of holes and flinty. A great cloud of dust rose behind us as we made a steady thirty miles an hour through the foothills towards the distant Sierra. Near Orihuela we stopped by the roadway in a forest of young Pines where we started to collect. Alan took a specimen of *Agrodiaetus ripartii* Frr. and several *Hipparchia alcyone* Schiff. but the smell of a dead sheep by the roadside drove us away and we arrived at Bronchales at 1.30 p.m. and drove up to the Hostal Ballester in the village to meet Senor Ballester who was to provide us with accommodation. As it turned out the Hostal was full—full of wives and children, fugitives from the heat of Madrid and spending a holiday in the relative cool of the mountains. The place was more like a holiday camp than a hotel but our host was charming and we were

led to a cottage in the village where we had the two downstairs rooms in which were four double beds, two to each room. During the next week we slept here and ate at the Hostal to the accompaniment of the hubbub of many boisterous future citizens of Spain. Having settled our equipment into the rooms we drove up the road above Bronchales and collected in the Pine woods. *P. apollo* was all over the place with the females obviously laying. The form here has red spots on the forewings which are particularly pronounced in the females. There were several large deer among the trees feeding in the grassy glades. Alan took two *Papilio machaon* Linn., very large and brightly coloured, and on some Sloes growing by the road I found two larvae of *Iphiclides feisthameli* Dup. and batches of eggs of *A. crataegi*. The larvae of *I. feisthameli* were nearly full grown and looked like fat green plums—when disturbed they vibrate and if touched extrude their osmateria. Both pupated before we arrived home. Beyond the Pine woods we found open meadows where mules were grazing and we saw *Colias crocea* and *australis* and the and this one proved to be very interesting as it fell into a gorge at the bottom of which ran a stream. Small springs emerged out of the slopes to cause boggy areas and great boulders had to be circumvented. *P. apollo* was everywhere and I took one perfect specimen of *P. amanda* Schn., the form of this Blue here being very large and brilliant in the male.

On the following day we made our first day-long sortie in the area and visited the valley south of Orihuela where I had taken *Iolana iolas* Ochs. on our previous visit. Coleridge unfortunately became sick—a result of our Soria meals—and had to take it easy in the car. Alan and I followed the stream up the valley through woodland and marshy glades. The whole area was alive with butterflies (and biting flies). These included *P. tithonus, C. iphioides* and *N. polychloros* and several very pale *M. didyma*. We saw no "*iolas*" but disturbed some eagles among the fir trees and in the marshy areas discovered a lot of young Green Tree Frogs climbing about among the rushes. We collected some for Coleridge and after going to the far end of the valley where the green changed to scorched brown grass and rocks, we retraced our steps. Halfway down we met a lady and gentleman collecting who turned out to be Germans, Mr. and Mrs. Hesselbarth. We chatted wih them as we walked back to the car where we also met Mr. Alcard, an Englishman, who was accompanying them. Coleridge was still feeling pretty sick and they kindly brewed a pot of tea which helped him a lot. After lunch we drove up through the Pine forest towards the village of Griegas. By the side of the road were one or two large open clearings rising to hilly slopes which were thick with Sainfoin and Horseshoe Vetch. We stopped here to spend the rest of the day and found the area very rich in butterflies. The Blues predominated—masses of *Agrodiaetus damon* Schiff. whose larvae feed on the flowerheads of Sainfoin and among the Horseshoe Vetch the

butterfly peculiar to this part of Spain, *Lysandra coelestissima* Vty. This is like a very bright blue *L. coridon* in the male, while the female is rather like *L. bellargus* Rott. (female). Others flying were *P. icarus, P. thersites* Cant. Chapman, *P. escheri* (a form with black dots on the lower edge of the upperside lower wings), and the very scarce *Plebicula nivescens* Kef., like an almost white/blue *P. dorylas* Schiff. in the male, the females being indistinguishable from *P. dorylas*. The species is again separated on the number of chromosomes, which is the largest number recorded among the butterflies to date. *P. dorylas* was also present to add to the confusion. I took one Small Copper, *L. phlaeas*, the very dark heat form and everywhere there swarmed the Queen of Spain Fritillary. Another new Blue for me was *Agrodiaetus fabressei* which is not separable from *A. admetus* Esp. other than on chromosome numbers but *A. admetus* is an eastern species. A few have the faint white line on the underside and could be confused with *A. ripartii*. *Lycaeides idas* Linn. was also common being very large and well marked. We finished early so that Coleridge could get to bed and in the night Alan went down with the sickness also. I managed to get some tablets from Mr. Ballester and with this and Chlorodyne they were able to get some relief.

The next day was Sunday and Alan stayed in bed all day while Coleridge and I went out again towards Griegas, this time going further along the road to a vast meadow, a dry marshland, behind which the wooded slopes stretched into the distance. The marsh was alive with *B. hecate* and *B. ino* and other Fritillaries while the slopes again supported masses of butterflies wherever there were clearings. All the Blues again including *Aricia montensis* and *A. cramera*. The New Clouded Yellow, *Colias australis* Vty., was everywhere and I watched females laying on the *Hippocrepis*. I wandered from clearing to clearing higher and higher up the slopes and over the top. We had agreed to rendezvous at noon and when I came to return I found the sun directly overhead and no help in finding my way back. Each clearing looked like the next so after wandering round for some time I made my way down into a valley but could see no road or car. At last I found the stream which I knew crossed the road near our car and following this I eventually found my way to the road about an hour late. Coleridge had not felt too good and had been wandering along the roadside collecting from clumps of Thyme—these were thick with *C. dorus*, peculiarly all females, and Hairstreaks. We had our lunch under the bridge which spanned the stream under the road and watched a group of Moor Frogs catching flies and butterflies that alighted on the wet stones to drink. The frogs leapt out of the water to make their captures and there were several "*apollos*" floating in the water. After our meal we drove back to the village to do some setting and found Alan much better but still weak. That night there was a terrific storm all around us with torrential rain and lightning which kept putting out the lights in the village.

Next morning, the 20th July, the sun was just as hot again and apart from the masses of leaves and twigs on the roads there was little to see of the storm. I bought some French beans in the square to feed our *L. boeticus* larvae and food for the day and we drove off to Moscardon, a very fruitful place on our last visit to Spain. On arrival we found the meadowed slopes, which had been so full of butterflies before, were all furrowed along the contours and planted with young pine and there was a large drop in the butterflies present. On the steeper slopes where the soil was not broken I found plenty of *L. coelestissima* flying and my first specimens of *Satyrus actaea* Esp. This was one which had always eluded me before and I was able to take some photographs. The Lavender was just out and was attracting most of the butterflies. I took two male *P. nivescens* and most of the species that we took near Griegas. Both *P. tithonus* and *P. bathseba* were again flying together and several worn *B. hecate*. We crossed the broken land at the bottom of the valley where there was a small reservoir full of Moor frogs and on the slopes beyond, where the chalky soil was almost bare, I found *Lysandra albicans*. The contrast between the habitat of *L. coelestissima*, on grassy slopes, with that of *L. albicans* is quite marked and despite the two areas being so near the two species seemed to keep to their own terrain. Alan made a surprising capture, a fresh specimen of *Arethusana arethusa* D. and S., a species which I have not yet taken. We then met Mr Hesselbarth and his wife and Mr Alcard again who drove on up the valley towards the Pine forest. Later we left the area and following the stream up to the end of the valley, we had our meal seated in the shade of a huge lone Pine. Nearby the stream ran down through a small copse and here Alan and I found several freshly laid eggs of *Limenitis reducta*, laid on the upper side of leaves of shrubby Honeysuckle (*Lonicera* sp.). The eggs were light green, spherical and dotted with little golden facets all over. On one bush only a few feet high Alan found several eggs and a pupa case. On the same bushes I discovered several webs of larvae of the Marsh Fritillary, *E. aurinia beckeri*, thus establishing with certainty that the food plant in this area is certainly *Lonicera*. I brought two webs home with me. Alan also found a larva of the Broad-bordered Bee Hawk, *Hamearis fuciformis* Linn. On Ragwort, *Senecio jacobaea*, there were large numbers of what appeared at first glance to be Cinnabar larvae, *Callimorpha jacobaeae* Linn., but the black bands round the bodies were disjointed—the species is still not ascertained. In the wood were several bushes of Bladder Senna, *Colutea arborescens*, and the seed pods either held full fed larvae of *L. boeticus* or had the exit hole of the larva and no seeds. We had had quite an exhausting day and drove pleasantly home to Bronchales in the evening sunshine. We had a very good view of an Egyptian Vulture overhead near Noguera. Unfortunately Coleridge was again ill when we got back to the village, with sickness.

We had planned to go after *Chazara prieuri* Pierret on the following day in its hot desert-like haunts below Albarracin. Coleridge

decided not to risk it so Alan and I drove down the twenty-five miles through Albarracin to the gorges below the town by the River Guadalaviar. Almost immediately we found the butterfly beside the road above the River and in the rough meadows beyond. It is an African species which has colonised suitable areas in Spain and here was flying with *C. briseis* which it closely resembles. What I at first took to be a very large Grayling, *H. semele,* turned out to be the dimorphic form of the female, form *uhagonis* Obth. and we were able to take examples for ourselves and Coleridge. *S. actaea* was very common and I also took *P. cecilia* Vall. On some Sloes we found four larvae of *L. feisthameli,* all full fed and despite the dryness of the terrain there were plenty of butterflies on the wing, including *P. daplidice* which were obviously migrating along the Gorge. The river looked very inviting so we found a deep pool where trout lay and had a very pleasant swim. The shingly edge of the stream was alive with Blues and Skippers and these included hundreds of *L. albicans,* a butterfly I had spent a lot of effort chasing on the day previous. Also present was the local Skipper, *Carcharodus boeticus* Rambur., a species of hot places in my experience. *H. comma* was also present and some very fine *M. jurtina.* We dried off in the sun and then drove back above Albarracin to explore the areas which had proved so rich on our previous trip. We found *C. prieuri* again here but little else as the whole slopes were scorched beyond recognition although this was only two weeks later than our previous trip. We sat down, a little disappointed, when we saw two bearded gentlemen (whom I took to be Spaniards at least) approaching. One had a home-made net and it turned out that they were two fellow countrymen who were camping near the town, one being Mr Levesley, a member of the AES. We spent some while chatting and then drove back up over the mountains to Bronchales. Coleridge seemed much better and managed an evening meal. The next day was to be our last at Bronchales and we decided to have one last look at the slopes near Griegas and were rewarded with the capture of several *P. pandora* which had so far eluded us in the area. At midday we went back to Bronchales and made a short foray to the slopes below the village which Col Manley had indicated might be worth a visit. However the area had been well cultivated and, where not, was so arid and stony that we gave it up and driving back through the village we had a last look in the Pine woods above. It is in these woods that the *Erebia zapateri* Obth. is to be found—a species localised to this part of Spain. It flies in the clearings of the Pine woods at the end of July and early August. We were obviously too early but only just, as a week later Dr de Worms found it here on the wing. *M. aglaia* was common and almost every Sloe and Hawthorn bush had larval webs or eggs of *A. crataegi* present. In the evening Alan and I climbed up to the village cemetery on the rocks above the village where a chapel stood. The custodian, an old lady, was about to lock up but we managed a brief look around—the memorials in white marble with glazed photo-

graphs of the dead seemed quite out of keeping with the mountain setting where native stone abounded—an ugly place in a beautiful setting.

The next morning we settled our bill—very reasonable at less than a £1 a day—and drove away across the plains towards Zaragoza. This drive was an education in what is happening in Spain. In the mountains we had become accustomed to the oxen yoked for traction, the scythe for reaping and the flail for the wheat but in the plain the combine harvester was at work. Two years before we had driven across this plain which then was virtually a desert of red dusty soil and rocky outcrop, covered with scrub or completely bare. Today the wheat stretched to the horizon; irrigation channels in concrete ran beside the roads and the places where we had collected on our previous trip near Zaragoza were now wheat stubble. Changes are taking place fast and much of the wealth of insect fauna, as in other parts of the fast developing world, is going to be greatly reduced. Forestry and agriculture are taking their toll in Spain as elsewhere. Soon after midday we reached the ancient town of Olite, seat of the Kings of Arragon, and having found nice rooms in one of the narrow streets we explored the Castle. This has been recently renovated in its original style with massive hewn rock. There is an orangery on the high terraces and a lion pit and a wonderful view of the plain from the topmost tower. We had our evening meal in the Parador, the best meal so far in Spain, and all felt fitter for it.

Our drive next day led into the foothills of the Pyrenees and we stopped along the way to explore some slopes covered with Gorse and bracken and coarse grasses. I expected to find the Skipper, *Heteropterus morpheus* Pall., here and we we were not disappointed. Also on the wing were a lot of Short-tailed Blues, *E. argiades,* and we took a live female home with us. We reached Biarritz in good time for our train and that night raced across France to Dieppe, then Newhaven and home. We agreed that Spain is an exciting and most interesting country for the naturalist—despite the changes taking place we hope that it will long remain so.

1.11.1970 P. W. Cribb (2270)

ADDITIONAL NOTES ON LIVESTOCK TAKEN IN SPAIN

Limenitis reducta. Of seven ova, two produced larvae which are at the time of writing in their hibernacula. The other five eggs produced minute Hymenopterous insects, too small to recognise by naked eye, about ten wasps to each egg.

Lasiommata maera. Eggs laid from a female taken at Riano produced imagines in September—two females and five males. No pairings were obtained.

Brintesia circe. A female taken near Burgos in copula lived for about two weeks on our return but failed to lay any eggs.

Coenonympha iphioides. A female taken at Riano laid eggs in a plastic container on stalks of grass. The resultant larvae fed on *Poa annua* and are at present hibernating—ceased feeding in October.

Syntarucus pirithous. A female was observed at Griegas laying her eggs on the flower heads of Lucerne. These hatched and fed to maturity on the same foodplant but failed to pupate. Several colour forms present in the one batch.

Euphydryas aurinia beckeri. Fed on garden honeysuckle on return and went into hibernation at end of August. Larvae at this stage about twice the size of *E. aurinia aurinia* being kept in same conditions.

Lampides boeticus. The small larvae when large enough were transferred from the rotting flower heads to French Beans and were fed to maturity on these. Garden Peas were offered but the shucks proved to be too hard for the larvae to penetrate. All emerged successfully.

1.11.1970 Alan Waters (2615)

BOOK REVIEWS

The Society has found that its more important reference handbooks can quickly become out of print for there is a continuing demand for them. This is also true of many other publications which are used as reference and text books by collectors and entomologists alike. Lack of funds or some fears as to the likely demand has meant that many very important works have been published in the past in inadequate quantities to meet a steady and continuing demand. The Society has found that to reprint such books with suitable amendments and revision would

involve prohibitive costs at today's prices and a resort has been made to the photographic offset-litho method of reproducing facsimilies of the original publications. The firm of E. W. Classey Ltd. of Hampton, Middlesex is to be congratulated for its efforts to make available to the entomological fraternity and to libraries facsimile copies of many important entomological publications which have gone out of print or circulation. The standard of these facsimiles is extremely high both in reproduction and bindings and will go a long way in filling gaps in private and public entomological book collections. Two of these facsimile reprodctions are reviewed below. Other titles of those already published or awaiting publication can be obtained from the publishers.

A Revised Handbook of British Lepidoptera. Edward Meyrick. Reprint 1970 E. W. Classey Ltd. 940 pp. with line illustrations. Price £5.

Edward Meyrick published his first handbook on the British Lepidoptera in 1895 and in 1927 an extensively revised and improved edition was produced by him. The new reprint is of this volume. It has an introduction, glossary and list of authors followed by a description of all the British lepidopterous insects—their imagines, larvae, foodplants and distribution. Butterflies and both Macro and Micro moths are dealt with in short paragraphs preceded by descriptions of the features of the Family and sub-Family. Line sketches of wing venations are included where appropriate. The notes on the Micro-lepidoptera are particularly useful as keys are included to assist identification and concise notes on this group of insects are not easy to obtain. Pictures of the insects are not included which seems the only shortcoming of a well produced handbook which should prove of use to any serious amateur lepidopterist.

The Natural Classification of the Families of Coleoptera. R. A. Crowson. 1967 E. W. Classey Ltd. 195 pp. 213 figs. Price £3.50.

The original basis of this work was a series of articles published in the Entomologists' Monthly Magazine between 1950–1954 and published as a composite text in 1955. This new edition is a facsimile of the 1955 publication plus Addenda and Corrigenda first printed in the E.M.M. in 1967. The book is almost essential to the student of Beetle classification. There are keys for the Superfamilies and Families accompanied by clear line drawings showing important structural features, wing venations, genitalia, etc. The classification summary at the end of the volume cross references to the equivalents in Junk's "Coleopterorum Catalogus". Extensive references and a good index are also included. The interest in the Coleoptera in the Society has increased in recent years and a new series on the group is intended in future *Bulletins* which will whet the interest still further—this Classification handbook should meet the needs of those who intend to study the order seriously.

1.2.1971 P. W. C.

A Field Guide to the Butterflies and Burnets of Spain. By Lt. Col. W. B. Manley, FRES and H. G. Allcard, FRES. 1970. 4to. 41 coloured plates, 192pp. text. Published E. W. Classey Ltd. Price £15. (Limited and numbered publication.)

This is the second important work on the European Butterflies to appear in 1970. After a lapse of nearly 100 years we have had Higgins and Riley with "A Field Guide" to all the European species and now this new publication by Manley and Allcard in one year. Little would be achieved by comparing the books as the second is a particular study of the Butterflies occurring in only part of the area covered by Higgins and Riley. This area is the whole of the Iberian Peninsular, the Balearics, the Canaries, and the Madeiras. It is a very comprehensive review of the species and sub-species occurring, their distribution, local forms and food plants where known. Descriptions of species are not included but there are descriptive notes on sub-species, races and forms. Stages of the insects are not described. The plates figure all the insects in the text and are all photographed as opposed to the paintings of Hargreaves in "Higgins and Riley" but the colour reproduction is so good that the result is almost faultless. Only the Burnet plates are a little indistinct but all are good enough for identification purposes. The insects are for the most part from the collections of the authors although not necessarily taken in the areas under review. It is a monumental work, representing as it does the accumulated knowledge of the two authors over many years of field work and research.

Systematic check lists in great detail are given for each of the four areas separately, which is very useful, and the Bibliography is detailed for each area and runs to 15 pages. The index deals with all species, sub-species and forms mentioned and the text includes notes right up to 1970.

I fault the method used to name the illustrations. This has been done by printing the details of the insects on the facing pages on translucent paper. As the list runs to two pages in some cases there is some difficulty in reading the names as those underneath show through. I fail to see the purpose of the translucent paper. I missed the inclusion of a good map showing the areas referred to in the text. This would have been most helpful. I also found some difficulty with nomenclature but in view of the doubtful status of some species there were obvious difficulties. I can see no point in introducing *Ladoga camilla* for *Limenitis camilla* while retaining the Genus *Argynnis* for most of the large Fritillaries. It seems a pity that there was not some collusion on the part of the authors of the two handbooks in order to obtain a standardisation of the nomenclature used.

The book must become an essential text book for the student and collector of Butterflies in the areas covered and should form a basis for even closer studies and more discoveries. It may also be important as

a historic record, in view of the fast changing face of the countryside in these parts. The authors must be congratulated on the care and attention which they exercised in producing this important addition to our knowledge of the Butterflies of this exciting part of Europe.
1.2.1971 P. W. C.

A Field Guide to the Butterflies of Africa by John G. Williams. Collins (45 shillings).

This book was published in 1969 and is one of the recent additions to the well-known Collins "Field Guides" series. It covers the more common butterflies of Africa South of the Sahara; 436 species are described and each is accompanied by a line drawing by the author. In addition there are colour plates (also by the author) of 283 of these species and Mr Williams has wisely economised on space by portraying the wings on only one side of each butterfly.

The introduction to the book gives general information on the Rhopalocera including family characteristics while the bibliography includes a number of useful references to relevant literature.

This book is strongly recommended to the entomologist or general naturalist who is likely to set foot in Africa, whether as a tourist or for a more extended stay. It is a compact book and will fit easily in briefcase or hand-luggage. Its colour plates are good and being arranged in families provide rapid identification of the commoner species. Those butterflies not illustrated in colour receive a full description in the text and both sexual and seasonal dimorphism are described in some detail.

There are many minor criticisms that can be levelled at a book of this kind but the function of such a Field Guide is to facilitate easy identification of the commoner species and this the book does well. It seems unfortunate however that ten pages are devoted to the collecting of butterflies and only four sentences (in the preface) refer to the value of breeding and rearing Lepidoptera. Much remains to be learned of the life cycle of many African species, as is evidenced by the number for which no "Larval Food Plants" are given in the text. Relatively few African butterflies are yet threatened with extinction but in a continent where development is proceeding apace, where insecticides are applied in thousands of tons annually, and where European and American dealers are increasingly extending their interests it would seem fitting that the first Field Guide to Butterflies should emphasise the importance of conservation.

Apart from this one major criticism the book is considered a very useful contribution to literature on butterflies and should be on the bookshelf of any naturalist with African interests.

J. E. C.

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AES
BULLETIN
No. 292
AUGUST 1971

EDITORIAL

Overheard recently, "My impression of entomologists is of old men chasing butterflies." This description may not be altogether inaccurate as far as the membership of some other entomological societies is concerned but I don't think it would be an accurate description of this society. We do however have our problems of ageing membership . . . one of our junior members has reached "retiring age" leaving a vacancy on AES council. Would any of our junior members interested in the post of Junior Representative on AES council and who would be able to get to council meetings at Caxton Hall, Westminster, please write to the secretary.

There will also be a vacancy for the post of treasurer. Phil Grey who has done the job so efficiently for the last few years is emigrating to South Africa in the Autumn. For details of the work involved please write to him at the address given on the inside of the front cover.

It should always be assumed that the opinions expressed in the *Bulletin* are those of the authors and not those of the society, unless stated to the contrary. It would help if members studied those opinions carefully before offering criticism. Entomologists tend to be a very individualistic race and apt to assume their ways and methods the best. Could I therefore put in a small plea for considered tolerance.

The exhibition is once again almost with us; as usual I hope to renew friendships and acquaintances. If you have a spare moment come and have a chat, that is if you can find me in what promises to be a very busy exhibition hall. Your views on the *Bulletin* will be especially welcome.

John Bocock (4211)

COLLECTING NOTES — AUGUST 1971

The Smaller Moths

Mr E. S. Bradford's output of drawings of Microlepidoptera has exceeded the eight a year needed to provide a pair for each quarterly publication, so, in response to several requests, we are giving three illustrations a time for the present. Whether this number can be maintained will depend on Mr Bradford. The Editor has kindly agreed to this addition provided we keep the length of our article within reasonable limits.

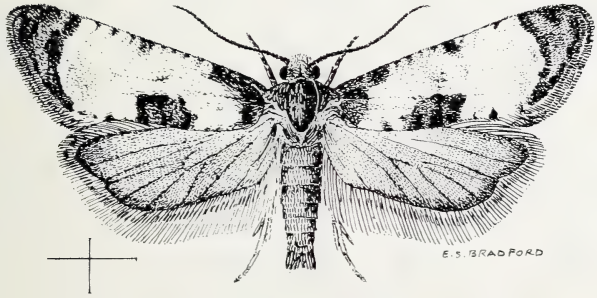
The moths shown in the drawings have larvae which are to be found in the autumn. *Reuttia* (*Thiotricha*) *subocellea* Steph. is a particularly interesting insect because of its unusual life-history. Although it is a Gelechiid, its behaviour is similar to that of some of the seed-feeding Coleophorids; it is the only British Gelechiid to live in a portable case. The food plant is Marjoram (*Origanum vulgare* Linn.) and the young larva starts at the end of August by eating out the unripe seeds in one of the florets. Having hollowed it out completely, it makes it into a case and fastens it on to a second floret which it excavates in a similar manner, retiring between meals into the protection of the case. In due course it moves on to a third floret and so on until it has finished its growth.

It is not really as hard to find as one would expect. If you examine the heads of Marjoram in the autumn and find a floret projecting above the general level, look carefully to see whether it grows from a stalk or (apparently) out of another floret; if the latter is the case, you have found *subocellea*. I have taken the larvae on several occasions on the North Downs in Surrey and Kent, but numbers seem to vary from year to year. Sometimes, as in 1967, it is very abundant. Ford reports finding the moth in a damp spot where there was no *Origanum*, and there are old records for *subocellea* from Wicken Fen. This suggests that there is another foodplant, possibly a related Labiate such as Gypsywort (*Lycopus europaeus* Linn.) or a species of Mint (*Mentha* spp.).

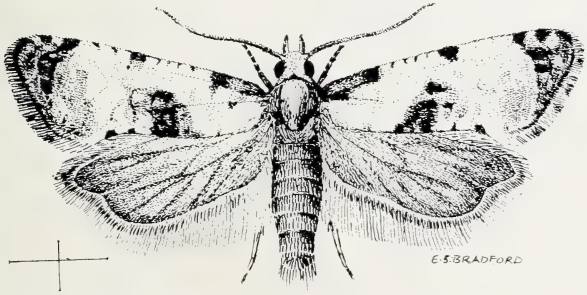
As long as the cases are not kept in an enclosed container, they survive the winter readily enough. I put mine in a plastic box covered with nylon and placed it in an outhouse. The moths emerged between the middle of July and the end of the first week in August. The forewings are whitish with fuscus markings. At the apex there is an ill-formed ocellus from which the moth derives its name.

The second and third drawings are of two very similar Phaloniids, and a comparison of the two may help with determination of specimens. *Cochylis dubitana* Hubn. has a dark thorax, while in *C. hybridella* Hubn. the thorax is whitish. The latter insect generally has a hint of ferruginous at the apex of the forewings which is lacking in *dubitana*. *C. hybridella* has a single generation which flies in July and early August, while *dubitana* has two broods, the first in June and the second in August. I

Reuttia (*Thiotricha*) *subocellea* Steph.



Cochylis dubitana Hubn.



Cochylis hybridella Hubn.

have never seen the larva of *dubitana,* which is stated to feed on the seeds of several species of *Compositae*, but the bright pink larva of *hybridella* is quite familiar. It feeds in the early autumn in the seed heads of *Picris hieracioides* Linn. (Hawkweed Oxtongue) and *P.* (*Helminthia*) *echioides* Linn. (Bristly Oxtongue). What good botanists insects are! These two foodplants were formerly considered to belong to different genera but now have been placed together; *hybridella* knew

all along that this ought to be done.

The larvae are easy enough to find in south-east England, especially in coastal localities, but rearing them successfully is quite another matter. They survive the winter, but it seems that there is something lacking to their needs when they are kept in captivity, for they fail to pupate in the spring. Eventually they dry up and die. I have yet to breed the imago.

Autumn fruits and nuts often contain the larvae of Microlepidoptera —I shall name only a few. *Cydia* (*Laspeyresia*) *pomonella* Linn. immediately springs to mind. People without entomological knowledge are often amazed that such a handsome moth can come from the grub they found so noisesome in their windfall apples. *Hysterosia sodaliana* Haw. feeds in the berries of Buckthorn (*Rhamnus cathartica* Linn.) spinning them together and causing them to turn purple prematurely. *Cydia* (*Grapholita*) *janthinana* Dup. feeds in a similar manner in the berries of hawthorn and *C. tenebrosana* Dup. (*roseticolana* Zell.) in the hips of roses; most of the larvae in hips however are dipterous. Among the Tineids there are *Argyresthia praecocella* Zell. which is found in Juniper berries and *A. conjugella* Zell. which feeds in Rowan berries. One of the most attractive of berry-eaters is the Phycitid, *Alispa angustella* Hubn., whose larvae occur in the berries of Spindle (*Euonymus europaeus* Linn.). I first found them by accident. I was commissioned to get some Spindle berries for decoration and we put a case of them on the piano. After a few days I noticed piles of orange frass on the polished surface and soon found the larvae responsible. These, augmented by others from the same tree, provided me with a nice series of imagines. These berry-feeding larvae like rotten wood or cork for pupation.

Acorns give sustenance to the larvae of *Pammene fasciana* Linn. (*juliana* Curt.) and *Cydia* (*Laspeyresia*) *splendana* Hubn. It is interesting that these two moths, belonging to different genera but similar in life-history, are so much alike in appearance. I have a batch of one or both species at the time of writing. Their parasites emerged in April, though I am not expecting the moths until July. Possibly this species of parasite has two generations and some other lepidopterous larva serves as host for the summer brood.

Beech mast is the food of *Cydia* (*Laspeyresia*) *fagiglandana* Zell. (*grossana* Haw.). I have not yet looked for the larvae in the autumn, but on several occasions I have come across them in late March, crawling on the trunks of Beech trees. They have evidently left their hibernacula and are searching for suitable tufts of moss under which to pupate. The moths should be killed as soon as their wings have dried; otherwise they quickly batter themselves to ribbons.

A. M. Emmet (1379)

REFERENCE

FORD, L. T. (1949) *A Guide to the Smaller British Lepidoptera.*

SO YOU WANT TO STUDY BEETLES ?
PART III. SCAVENGERS

Many people will not realise it but humanity owes a great debt to the vast numbers of Coleoptera whose whole existence is centred on the removal of the unwanted, the debris and the left overs of life. Vegetable refuse of all sorts is used as breeding sites for a great many beetles as is also animal refuse, both in the forms of dead carcases and excrement. It is the latter, the beetles associated with dead meat, hides, skin, feathers and bones and also those found in dung of various kinds with which this article is concerned.

1. Scavengers of Carcases

A great many coleopterous species have life histories which are linked to the dead carcases of animals and birds; even dead fish are used should their carcases become available. It is impossible in an article of this length to mention all of them but some indication of the major species will be given with methods of catching them and suggestions for breeding and studying their life histories.

As soon as an animal or bird dies, it begins to decay and even the faintest odour of decay is picked up very readily by the *Necrophorus,* those striking black and orange beetles which are rarely seen, and these soon start to arrive at the corpse. They immediately tunnel under the dead body in order as far as possible to bury it. This is to maintain the meat in a sufficiently moist state for their larvae to develop.

Very shortly after the Necrophori, species of *Silpha* may appear at the corpse, sometimes in very large numbers. *Silpha* larvae are well known as pests on root crops so why they are attracted to corpses is not known. The next species to arrive, as the carcase begins to dry out, are the *Staphylinidae* and the *Histeridae*. The larvae of both families are carnivorous and presumably feed on the decaying meat. Finally *Dermestes* species infest the hide or feathers and Clavicorns, Necrobias and Corymetes attack the drier parts of the body and the bones.

Collecting Specimens from Carcases

For this we require a fairly large, light, rubberised fabric sheet, a trowel, a short garden handrake and a couple of stout wooden sticks (these can usually be cut near the site). I would also advise a pair of rubber gloves if extensive handling of a corpse is necessary. Personally I avoid touching the corpse more than possible. Some may think this is unduly fastidious but when it is remembered that fur and feathers are very favourable places for harbouring harmful bacteria I feel one cannot be too careful. When one finds a suitable corpse, first place the rubberised sheet close to it. If the corpse is small enough transfer it to the sheet using the garden hand-rake and a stick (wearing rubber gloves, it may be moved by hand). Immediately examine the ground on which the body was lying, if necessary using the trowel and rake to dig

up three or four inches of loose soil for any beetles buried there.

Next, gently beat the corpse on the sheet. Push it to one side—still on the sheet—and collect the beetles that have fallen from the carcase. Repeat the process, turning the carcase over occasionally, until no more beetles appear. Sometimes it is convenient to spear the corpse with a sharp stick and hold it above the sheet while beating it.

For corpses one depends on chance finds of suitable material. However the debris left lying in the vicinity of foxes' earths, particularly when there are cubs present, provides corpses in all stages of decay and a rich spectrum of beetle fauna. Remember that different beetles appear at different times of the year and so several visits to an earth should be made.

With larger animals, dead sheep or deer, which are difficult to move, two rubberised sheets are needed. Place the first sheet close along the back of the animal and using a rope round the legs pull the animal over onto the sheet. Quickly examine the ground where the corpse was lying and then cover this with the second sheet. The animal can now be rolled from one sheet to the other whilst being prodded and beaten as desired until all the beetles have been revealed. One can rework a corpse at intervals of 7-14 days for a long time and in favourable cases a full spectrum of the beetle fauna can be revealed over a period of six months.

Another good source of cadaverous beetles are the old fashioned gamekeeper's lines, where dead birds and squirrels are hung up. These can be beaten holding a beating tray underneath. These lines are unfortunately much scarcer than they used to be.

In addition to the examination of corpses, we can set traps. Many beetles that seem scarce on corpses can readily be obtained by trapping, enabling carniverous species to be found when no bodies are available. There are several types of trap but as the main difficulty with them is that foxes and other mammals will pull the traps out and turn them upside down to obtain the meat or fish used as bait, I have always found the simplest type of trap which can be wedged into the ground more satisfactory. Jam jars or coffee jars are the basis of the trap. Almost any size can be used but a 2lb. jam jar or 8 oz. instant coffee jar is most satisfactory. Place a small piece of liver or fish (a little bigger than a 10 pence piece) in the bottom of the jar two or three days before the trap is laid. To lay the trap, cover the meat or fish with a small amount of sphagnum moss and bury the jar almost to the rim in the ground, wedging it firmly with sticks if necessary. Place two or three small twigs over the top and cover the whole with a piece of bark from a dead tree. Camouflage with grass or moss to hide it from inquisitive passers-by. The bark prevents the jar filling with water in rain. The rim of the jar must be just above the ground surface so that water will not drain into it but not so far that beetles have difficulty in crawling in. Traps of this kind produce some beetles after 24 hours. If traps can be visited daily,

useful information as to the order in which various species of beetle are attracted can be made. I have some evidence that there is an order of arrival even amongst various species of *Necrophorus*.

Studying and Breeding Carnivorous Scavenger Beetles

These beetles should not be too difficult to study and to breed. I once accidentally obtained six large larvae about to pupate of *Necrophorus humator* in a trap. This trap had been left for a fortnight. There was only one female *N. humator* in it and the six larvae. Unfortunately I did not bother to try to rear them. It is probable therefore that female beetles placed on three day old liver will lay eggs on it. I suggest that only a small amount of liver be used and that if larvae are obtained more pieces of three to four day old liver be added daily, adding only just enough at a time for the larvae to consume in a day. In this way the meat will always be in the correct condition of moisture. Three to four day old liver is in the right condition in moderately hot weather and the age of the meat must be varied by a day or two according to the temperature.

A more sophisticated cell for studying these beetles can be made from glass and a wooden frame or from plastic sheet stuck together. (See Fig. 1.) The cell consists of a cubic box ABCDEFGH made of transparent material. A top to close the box may be made of the same or any other suitable material. The dimensions of the box are not important but 6-12 inches for the side of the cube are convenient. The box need not be cubic, any suitable square shape will do. Right across the centre of the floor of the box parallel to one of the sides is inserted a narrow cell LMNOPQRS (LM=NO=PQ=RS). The dimensions of this cell depend on the size of the beetle to be studied (RN=SO=PL=QM=AB). The side RS is of a size so that the beetle can just move around in the cell. The lower cell is completely filled with fine sifted earth and the top one with just enough to cover the bottom. Some three or four day old liver is placed in the large cell over the opening of the narrow cell. The beetles will proceed to bury the liver. Since the cell dimensions are such that the beetle can only just fit the cell, the tunnel will have one of the sides as the transparent cell and the beetle and larvae if any can be observed. The depth of the cell should be made of the correct depth for the species of beetle being studied. A cell of this type was tried out late last autumn when the beetles were going into hibernation and proved most promising. The narrow cell should have a bottom made by inserting the sides into plaster of Paris. This can then be placed into water to keep the soil suitably moist. Watering the soil from above is unwise as this encourages mould growths. When not being observed the cell should be kept in the dark.

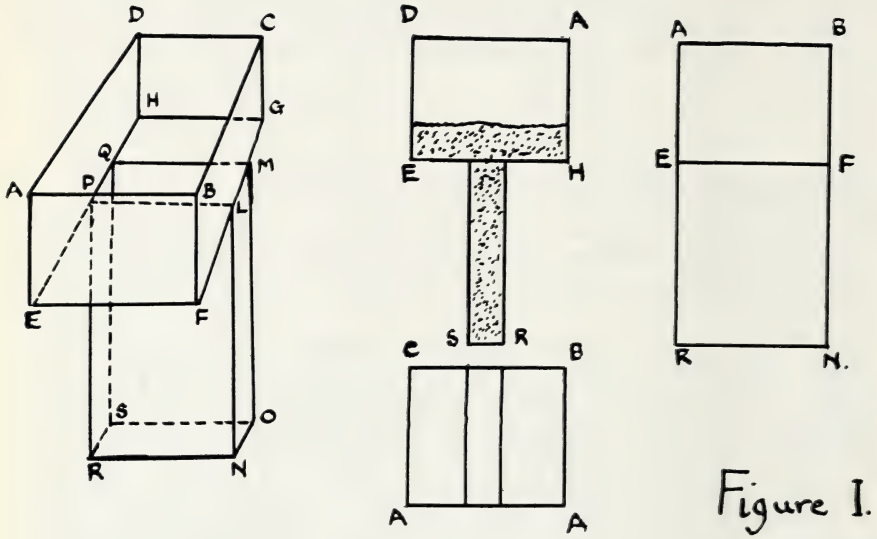


Figure I.

2. Scavengers of Excrement ("Dung Beetles")

The Dung beetles may be divided roughly into those that bury the dung before laying eggs in it and those which use the dung as it is found. The Dor beetles, the *Geotrupes,* are par excellence beetles which bury dung before using it. On arrival at a patch of dung the beetle burrows beneath it. Horse dung, cow dung and sheep dung are the more usual although any dung will be used if necessary. They then dig a hole 6 to 18 inches deep in the soil. They pack the far end of this with dung and lay eggs it in—hollowing out the pile of dung from beneath. It appears that a pair of the beetles work together on this but it is not always so. There is a tendency for some Dor beetles to prefer sheep dung whereas others seek horse or cow dung. The beetles can often be found on the surface of dung piles if these are examined with a torch about an hour after dark. They are occasionally found by turning over piles of dung, when the beetles quickly disappear down their tunnels. Their tunnels are often seen when turning over dung. They can readily be dug out using a garden trowel but it is essential to first push a reed or long thin twig down the hole as the sides collapse readily and the route of the hole is soon lost unless marked before digging begins.

The genus *Aphodius* contains a large number of species whose precise habits vary. Some are very particular and are only found in deer dung. Some, despite the wide and general availability of their food

supply are fairly restricted in their range, a problem that could well repay study. These beetles are found in all kinds and conditions of dung. Some prefer to rest under the hard crust of cow dung, some prefer horse dung which has to be very carefully broken up if some of the rarer beetles are to be found. Rubber gloves are quite useless for this. The only gloves suitable are the very thin plastic gloves used by doctors for certain jobs. These are meant only to be used once. They are exceedingly thin and very suitable for use in examining dung. However generally the bare fingers are best. Dung can be collected, brought home and the beetles extracted from the dung using some form of Berlese funnel. Suitable ones have been described in "A Coleopterist's Handbook" published by the AES.

Most dung beetles belong to the *Palpicornia,* but *Clavicornia* and *Staphylinidae* are also found.

Studying and Breeding Dung Beetles

For the larger beetles a cell similar to that already described can be used, dung being placed in the large top part of the cell. For the smaller beetles which stay in the dung or do not go very deep in, the very narrow cells filled half with dung and half with finely sifted dung may be used, the bottom being of a plaster of Paris block which can be stood in water. The narrow sides can be made of plywood veneers, and the broad sides of plastic or glass.

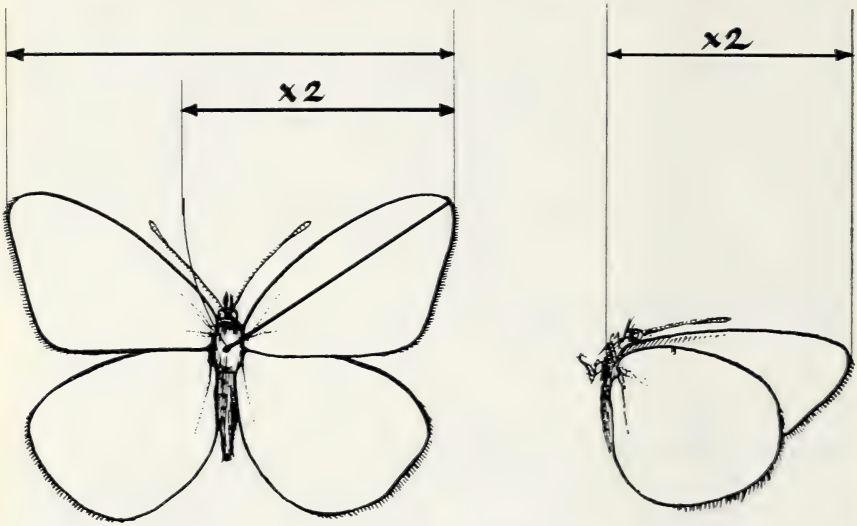
One of the main difficulties in breeding dung beetles is mould growth on the dung. In all cases where I have tried it, I have found that a few crystals of Thymol are very effective in preventing mould growth and do not seem to harm insects or larvae. If in studying such beetles you fail to breed certain species when conditions seem ideal and other species thrive, remember that it is always possible that they may prey on dipterous larvae that often breed in dung also.

Although in some instances larvae of the scavengers are known, in many cases they have never been found. These suggestions for rearing and studying the beetles are only suggestions. Any method is worth trying. The secret is no doubt to preserve the correct microclimate. Certainly the cell described can readily be altered in various ways.

Finally, keep copious and accurate notes. Record all details of behaviour immediately, however trivial they may appear. We know so little about the accurate life histories of these insects that any occurrence may ultimately give the clue to successful breeding.

B. J. MacNulty (4603)

MEASURING LEPIDOPTERA—A CAUTIONARY NOTE



I read with considerable interest Mr Leigh Plester's article "Measuring Wingspan in Live Lepidoptera" (*Bull. Am. Ent. Soc.* **29**: p. 109) in which he describes an ingenious board for this purpose. Having measured several thousand Meadow Brown Butterflies *Maniola jurtina* L. in the last few years and worked on the quantitative analysis of many aspects of the species, I feel that I must point out one factor which could create some considerable discrepancy and confusion.

In making any series of measurements or counts it is essential that these are standardised, that is, that in the case of measurement, comparisons can only be made between figures which have been taken from the same two points. This might seem obvious, but in the past two methods have been used for the wingspan of butterflies and, regrettably, comparisons have been made between them. The two methods are shown in the illustration. One way is to ensure that the inner margins of the forewings lie at right angles to the body of the insect, the measurement being taken at the widest part parallel to the inner margins (as in Mr Plester's method). Unfortunately, this has a number of drawbacks. In the first instance, the wingspan is dependent upon the "set" of the wings and it would be more than likely that various series of set specimens (particularly in old or museum collections) would give grossly inaccurate results. Furthermore, using this method a further variable—shape of the costa—is introduced. The vast majority of wing measure-

ments in recent years are taken from the centre of the thorax to the tip of the apex, this figure being multiplied by two, thus measuring twice the wing length (plus a little bit of thorax) rather than the wingspan as such. The advantages of this treatment of the situation should be obvious. It would be preferable to take the measurement from the wing base (at the radial or sub-costal vein) to the apex, but, as most published measurements include the extra distance to the centre of the thorax, it would be unwise to introduce more confusion. This could always be avoided by clearly stating how quoted measurements have been taken. It is, therefore, quite unnecessary to use a board or device other than a millimetre scale to take measurements, whether the individuals are live, papered or set.

The different measuring techniques would explain the difference between Mr Plester's below-normal figures and those of Pulkkinen.

A final word about the accuracy to which measurements should be made: Mayr sugests 0.5mm for sizes between 40mm and 50mm which would include most of our Satyrids. It is important, however, to calculate the final average correct to at least one decimal place to be useful in even our least variable species.

George Thomson (3689)

Parometers for the measurement of wingspan in Lepidoptera.
BIERNE, B. P. 1952. *British Pyralid and Plume Moths*. Frederick Warne, London.
Argyresthia glaucinella zell.
Swammerdamia pyrella vill.

USE OF A NEW MATERIAL FOR RELAXING TINS

The relaxation of specimens which have been papered for some time or which require to be reset is a problem which faces most collectors and new ideas about relaxing tins are always welcome. The use of a hypodermic needle and warm water has been advocated and is very efficient but unless the insect has already been made suitable for manipulation there is a great danger of breaking off legs, antennae or injuring the body. The need for preliminary relaxation is still present and recently I have been using a new form of relaxing tin which is proving very successful.

The container is a plastic luncheon box as available from most general stores—much better than the old tin box as it is rust proof and not affected by most chemicals (although Ethyle acetate will cause crazing). For the moisture retaining material I use a material used by the florist industry for floral displays in baskets, etc. This is a green plastic material with a very high moisture retention factor and is called

by the trade name of *Oasis*. It can be bought in slabs from florists and when wetted it becomes very heavy and can be easily cut into slices with a sharp knife. I cut a thickness suitable to the depth of the plastic box, soak it well in a mixture of methylated spirit and clean water, trim it to the shape of the box and place it in the bottom. I find the use of methylated spirit inhibits the growth of moulds which are such a nuisance in the relaxing tin. Over the *Oasis* I place a layer of thin polystyrene tile material, cut to leave a narrow space all round. Papered insects can be laid directly onto this polystyrene layer or pinned insects can be pinned into it. The lid is then secured and the whole placed into a temperature of about 70°F. and left for twenty-four hours. After this the insects will be found to be either sufficiently relaxed to set immediately or in a state suitable for the use of the hypodermic. I have used it with complete success for insects which have been papered for many years.

It is unwise to leave insects in the relaxing tin for a period of more than 48 hours as I find that they will often absorb so much moisture that they disintegrate. This is particularly so of small specimens.

1.2.1971 P. W. Cribb (2270)

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PLASTIC RESIN EMBEDDING

My introduction to plastic resin embedding came when I was aged about ten. I gazed in awe at a magnificent Hawk Moth set in a block, of what seemed to be, solid glass. The hundreds of cigarette cards and marbles that I offered for it were curtly refused by its young owner, but I don't think that I ever stopped coveting it. I certainly remembered it quickly enough when I came across an advertisement for a do-it-yourself plastic embedding kit. It wasn't very cheap, but the chance to realise one childhood dream (I've never driven a train, a plane or a bus) was too much, so I dug down deep and sent off for a kit.

It didn't take too long to learn how to use the stuff and, as several of my friends have viewed some of my efforts with as much interest as I showed towards that Hawk Moth, I demonstrated the technique at the 1970 AES exhibition. As a result of the interest shown in the method there, and so that those of you who missed the Exhibition can get to know how it's done, I have written this article which, I hope, will encourage some of you to try what, I think, is an interesting, and for teaching, display and preservation purposes, a valuable technique.

The plastic, that I use, is sold under the name KRISTABLICK by P. K. Dutt and Co. Ltd., Clan Works, Howard Road, Bromley, Kent. It

costs £2 (plus, just under, 10/– for postage and packing) for a kit consisting of: two pints of liquid plastic monomer, sufficient catalyst (hardener), mould release compound and a detailed instruction leaflet, from which much of the technical detail given in this article has been taken. In addition to the materials included in the kit, a plant colour preserving agent (chlorophyll is broken down by the embedding process, and because of this plant material should be soaked in the plant colour preserving agent for a day or two before embedding), and a dip which is used when degassing dry specimens, are obtainable separately. The catalyst and monomer are best stored in a refrigerator as they tend to deteriorate (the monomer becomes cloudy) if stored at room temperature for more than a few months.

Other brands of resin are available. One is sold under the name PLASTICRAFT by Turner Research of Leeds. A kit (intended for the preparation of trinkets and curios rather than scientific specimens, and containing less plastic than the KRISTABLICK kit, but including a glazed mould block) costs 48/–, although the monomer and catalyst are available separately at more reasonable prices. Another (and the cheapest) source of embedding resin is the Strand Glass Co. Ltd., Brentway Trading Estate, Brentford, Middx., who sell the monomer in 3lb., 10lb. quantities (hardener supplied) at 15/9 and £2/7/6 (postage 2/6). This firm also supply mould release compounds, mould making materials, and cleaning agents in bulk.

Once the equipment has been obtained the next requirement is a specimen to embed. The technique is suitable (with minor variations) for specimens preserved in formalin, dehydrated in alcohol or truly dry. Lepidoptera are not recommended for treatment, as the process often destroys their colours. However, my Hawk Moth was O.K. and I have seen other embedded moths, so it may be a case for trial and error. A caution of a more general note may be useful as this technique (along with most others) carries the risk of failures at first, so the first few specimens should not be irreplaceable.

The size of the specimen to be embedded will determine the size of the mould required. This mould may be made of polythene, metal, rubber or glass (miscoscope slides held together with plasticine are very suitable) and the better the surface finish of the mould the less polishing will be required to finish the block. Rigid containers should have slightly tapered sides to enable the removal of the cast block. Before casting begins the mould should be treated with the mould release compound which is reputed (I frequently find that I have to break microscope slides away from the cast to free the block) to enable the easy removal of the cast block.

When this has been done the embedding process can begin. For those of you who are as naive as I was, the idea is not to end up with a block of solid plastic and to then push, wish, or spirit the specimen

inside, but to construct a sort of sandwich with the specimen as the filling. Casting therefore takes place in two, or more, layers. Monomer and catalyst are mixed together thoroughly in portions of 98 : 2 (these proportions vary slightly according to factors such as ambient temperature, and thickness of layer to be cast) in a clean dry container. This container may be made of any of the materials suitable for making the moulds, although paper (not polystyrene) cups are excellent. After allowing 10–15 minutes for air bubbles to separate out, the first layer of plastic can be poured into the mould. This layer should, for small specimens such as insects, be about a quarter of an inch thick, and is allowed to gell enough to support the specimens and labels (this takes between about half an hour and an hour). It should be pointed out that what may be gelled enough to support an insect may not be gelled enough to support a geological specimen.

The specimen to be embedded can then be placed in position on the base layer. Formalin preserved specimens should first be washed under a tap and the outside allowed to dry; alcohol dehydrated specimens should be soaked for a few days in the uncatalysed monomer, then dipped into catalysed resin, then embedded, and truly dry specimens should be degassed by immersion in the special dip or isopropyl alcohol (Boots the Chemists 500 ml. for 5/3) and cycling, a few times, between ambient temperature and about 50°C. (in hot water NOT a naked flame). It is, however, usually quite satisfactory to immerse the latter class of specimen in catalysed monomer for about 15 minutes, and then to embed.

A one-tenth of an inch thick layer of the catalysed resin can be run onto the specimen once it is in position. This serves to prevent the specimen rising to the surface when the covering layer is poured on, and to prevent the join marks that form in the finished blocks if the support layer is allowed to gell excessively.

The covering layer (or layers if the specimen is very thick) is then poured, and the block is put aside for 24–48 hours to set. After this time the block is removed from the mould and allowed to cure. This takes 1–2 weeks at room temperature or 1–2 days at 37°C. The block may then be cut to shape using a fine saw, a file, or very coarse sand-paper. Saw marks, etc., can be removed using increasingly fine grades of sand-paper, and a polish applied with a buffing wheel. A final hand polish with metal polish (e.g. Silvo) and a soft cloth gives an excellent finish. If a buffing wheel is not available rubbing down with "flour"-paper gives a surface that can be finished by hand polishing. The finished blocks are best stored out of reach of strong direct sun-light.

Equipment can be cleaned of monomer, catalyst and a liquid mixture of the two by swabbing with acetone. While the solid polymerised resin can be removed by boiling in detergent.

Brian R. Benham (4393)

A SIMPLE AND SAFE BREEDING CAGE

The important things about a good breeding cage are ventilation, security from predators and parasites and easy manipulation. Good ventilation is achieved by the maximum use of material through which air can pass and the minimum use of frame, glass, etc. Security from predators means that openings such as doors, etc., must be sealable at all times and if the smallest parasites are to be excluded, the air permeable material must have the very finest mesh. Easy manipulation requires that food plant and insects can be easily got at without danger of loss or damage. I have used a variety of methods; bell-jars inverted, aquarium tanks suitably modified and built cages as supplied by "Butterfly Farms". All have their snags and I put forward the following as being the most suitable type of cage I have developed to date—both for rearing native insects and pairing and overwintering.

Construction is simple—all that is needed is four pieces of 2ft. x 2in. 1in. planed deal or similar wood and eight pieces of 2in. x 1in. of 12 inches in length—or their metrical equivalents. Make two frames by halved joints using two pieces of the 2ft. and two pieces of the 1ft. lengths of wood. Then using the four other 1ft. lengths join the two frames into a rectangular box which will measure 2ft. x 1ft. x 1ft. 2in. —this is a skeleton cage and can be made by the merest amateur carpenter (which I am). At one of the small ends of cage fit a bottom —preferably of sheet aluminium which will not rot. This can be nailed in position to fit the bottom exactly. The whole is then painted with green bitumastic paint and allowed to dry.

Now purchase a suitable length of fine mesh nylon or terylene curtain material—the mesh must be the finest (similar to the mesh used for ladies' slips, etc.). To use a coarser mesh is to court disaster and the very small parasitic wasps which attack pupating larvae will certainly get through it as will wasps of the *Apanteles* group. The next stage requires a wife or girl friend. The material is made up into a bag just large enough to contain the cage you have made, plus a neck. This is virtually a nylon or terylene sleeve or sack, closed at one end and opened at the other. The cage is stood in the bottom of the sack and this is then rolled up to envelope it and finally securely tied at the neck. The cage can be stood on a base or hung up by its neck, if thought better, from a hook or tree branch, etc.

The whole is completely insect proof, easy to open and change the food plant, etc., totally ventilated. If protection from rain is desired a sheet of Perspex or equivalent can be fitted to the top of the cage, inside the sack, so that only indirect rain affects the cage.

I have found the cage suitable for all native species including *Apatura iris* Linn. and *Mellicta athalia* Rott.

What has been made is in fact a framework over which a sleeve has been fitted. The glass-less frame of an aquarium or any other open

framework is equally suitable so that you may have a suitable frame already available and only the sleeve needs to be made. When sleeving larvae on growing plants I have always found that some sort of frame is desirable as it keeps the sleeve fully extended and clear of the leaves and prevents it from bagging and reducing ventilation, particularly important when the sleeve is wet for long periods in winter (or summer for that matter). Unless one is trying to force material or breeding exotic species, the nearer that your breeding cage is to the natural, the better.

1.2.1971. P. W. Cribb (2270)

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IN THE FOOTSTEPS OF OTHERS

It did not take long to read the November 1970 Bulletin (Vol. 29: 289). So I took out volumes from the 1950s and soon found myself enjoyably engrossed in re-reading back numbers. Two things emerged from my browsing. Firstly, it was clear that the Society owes a great deal to regular contributors for keeping the Bulletins alive (thank you very much Mr Cribb et al.), and secondly, I realised that I personally owe a lot to some of these contributors in that they have had considerable influence on the planning of various family annual holidays and escapades. I was surprised by the realisation that I had followed up a large number of Bulletin "tip-offs" over the last few years. In the summer of 1967 we ventured to Winspit Bay on the South coast, to see the Marbled White *Melanargia galathea* Linn. mentioned in a previous issue. Minutes after arrival a blanket of sea mist leapt up and soaked us to the skin, but in spite of this, the Marbled Whites and Chalkhill Blues *Lysandra coridon* Poda. continued to fly. A second visit on a sunny day produced a feast of butterflies in addition to the above—a memorable day in a spot we would never have found without the Bulletin.

Later that year we visited the New Forest, camping with our caravan at Brockenhurst, to follow up various reports of the White Admiral *Limenitis camilla* Linn. An interesting time was spent on some evenings with members of the TIEG camp, sugaring, and using my small U/V light connected to the car battery. Rob Dransfield and the TIEG members had another such light, and we had some good recordings between us. My light attracted among other species a Pine Hawk Moth *Hyloicus pinastri* Linn. and a Dark Crimson Underwing *Catocala sponsa* Linn. A "strange" moth which turned up at midnight one dull evening, turned out to be a Purple Hairstreak *Thecla quercus* Linn. This was taken at the end of the track running through the camp site, the light being under a large oak at the point where cars are allowed no further.

Oddly enough, one year later almost to the day, I was again on this site, and again a male Purple Hairstreak was attracted to the light at the identical spot. If anyone has other records of this or other species coming to light, perhaps we could have an article?

While planning the 1969 holidays we decided that our two boys were old enough for a caravan-abroad holiday, and both being teachers, this meant that we could plan a longish tour. We fancied revisiting France, Switzerland and Italy, and decided the first part of the holiday should be a copy of Mr Peter Cribb's Switzerland report in AES Bulletins 26: 57-61, and 26: 91-95, visiting Feisch, Gletsch, Brig and the Simplon area, and to follow this with a stay at Baveno on the Italian Lakes, and finally have a run down to the Italian and French Riviera.

After the crossing in late July, and two days of driving, we camped at Cully on the side of a yacht basin on Lac Leman. The commonest butterfly around the harbour was the Wood White *Leptidea sinapis* Linn., closely followed by the Small Blue *Cupido minimus* Fuess. The Map Butterfly *Araschnia levana* Linn. was also present here—and had been common in the fields outside Besancon on the journey down, but this is one butterfly I cannot seem to net, or approach close enough to photograph. We soon travelled on to Morel, between Brig and Gletsch up the young Rhone Valley. This site was a real find—inexpensive, good bar/restaurant, and a marvellous centre for Lepidoptera. The caravan was parked on the banks of the Rhone, and on arrival I went to report in at the office. There was a wet patch of grass by the shower block, and as I walked through it hundreds of Blues swept up into the air and danced about until I had passed by—then resettling to take up the moisture. This was a beautiful sight to see, and the carpet of *Agrodiaetus damon* Schiff. and *coridon* made a lasting impression.

Silver Washed Fritillaries *Argynnis paphia* Linn. and beautiful, freshly emerged Swallowtails *Papilio machaon* Linn. flew commonly through the camp site. The hills above the camp produced the large Satyrs *Satyrus bryce* Hub. and *Hipparchia fagi* Scop., along with the Large Wall *Lasiommata maera* Linn., the yellow *Colias hyale* Linn., and the Fritillaries *Melitaea didyma* Esp., *Mellicta varia* Mey.-Dur., *Melitaea cinxia* Linn., *Fabriciana adippe* Rott., *Mellicta athalia* Rott., etc. There were also commonly the Blues *C. minimus, A. damon, Albulina orbitulus* Prun., *L. coridon, Plebejus argus* Linn., *Lysandra bellargus* Rott., *Cyaniris semiargus* Rott., the Copper *Heodes alciphron* Rott., the Apollo *Parnassius apollo* Linn., with hundreds of Whites and Skippers everywhere. The reader can have an idea of the joy of this place—and all without moving a car.

We visited Feisch, as had Mr Cribb, and what a feast there was here. All previously mentioned species occured, but other impressions come to mind—the Apollo flitting commonly up and down the scree slopes—the beautiful Scarce Copper *Heodes virgauraea* Linn.—so

common that the grasses were filled with a brilliant red irridescent sparkle—the Queen of Spain Fritillaries *Issoria lathonia* Linn. gently rising from the hot paths and settling ahead of you, only to be disturbed again—Silver Washed Fritillaries doing aerial battle with other large Fritillaries—the flower heads alive with every shade of blue butterfly, and numbers of small Fritillaries too long to list.

We followed Mr Cribb to Gletsch, and drove up the Furka Pass. In this valley the Mountain Clouded Yellow *Colias phicomone* Esp. was so common that my wife netted four in one swoop while attempting to catch a Copper for identification. Another thrill here was catching the Small Apollo *P. phoebus* Stich., and seeing all the high mountain Erebias and Fritillaries.

We visited the Ganter Bridge, St. Nicklaus and the Simplon Pass, and one could fill an issue with the species and delights experienced, but all these areas can be read of in previous Bulletin articles. However, no one should visit this district without experiencing the chair lift and cable car from Morel to Reidmorel. The scenery is beyond simple description, and where the Aletsch Glacier runs through a Nature Reserve area, we sat and watched the Adonis Blue *Lysandra bellargus* Rott. and the Blue *Maculinea alson* Schiff., flying in profusion.

Friends often ask "What about the moths?" Moths attracted by the fluorescent lighting could have been scraped from the washroom walls at Morel in their dozens, but I could not have identified them, or set any, as it is as much as one can do to attempt to record faithfully the immense butterfly population, and set the odd one or two in the evenings. I carried the U/V light everywhere with me, but was so satiated with butterflies that it was never switched on.

On moving to Baveno the change of environment meant a change of species and new experiences. A track up beyond the Churchyard leads to a rocky mountain stream (almost dry at this time of the year) lined with hundreds of wild Buddleia bushes. Here we saw the Brimstone *Gonepteryx rhamni* Linn., the Speckled Wood *Pararge aegeria* Linn., the Comma *Polygonia c-album* Linn., the Satyr *Minois dryas* Scop., and the Scarce Swallowtail *Iphiclides podalirius* Linn. While standing on a high rock in mid stream, feasting my eyes on the Buddleia bushes, I instinctively swished upwards with my net as something came zooming upstream and nearly removed my left eye. This turned out to be a perfect, large Camberwell Beauty *Nymphalis antiopa* Linn. In the hills above Baveno we found a small colony of the Admiral *Neptis rivularis* Scop., a species Mr Cribb had asked me to look out for when he recommended certain localities to me. I was able to send him two, though they were past their best. At Pollino the White Admiral *Limenitis camilla* Linn., the Skipper *Heteropterus morpheus* Pallas and the Swallowtails *podalirius* and *machaon* were everywhere.

Later at Cervo and Diano Marina, and on the interesting ride from Andorra via Testico to Alassio, we had similar good hunting. The clearest memory of this area is of wearing myself out chasing after the Orange Brimstone *Gonepteryx cleopatra* Linn. along the parched river beds. We also caught a green Volkswagon on one narrow road, but managed to set it free relatively undamaged.

So much for 1969. In 1970 we covered another route well described in previous Bulletins. We firstly pottered around Lake Annecy. Up near Bluffy, I was fortunate enough to catch a lovely female Purple Emperor *Apatura iris* Linn. flying almost at ground level. Looking up we saw what appeared to be the largest, oldest Sallow in creation, growing up through an Oak tree and topping it by about fifteen feet. Half a dozen Purple Emperors could be seen sunning themselves on the leaves. Throwing up a stone led to them all darting out to investigate it as it fell, but returning, much to our frustration, to their original favourite leaf just before flying into net range.

Later we visited La Grave (see previous Bulletins), and Digne. Here we teemed up by chance with another caravanning entomologist—Joe Firmin and family, and we spent hours "baiting" the Southern Purple Emperor *Apatura ilia* Schiff. We tried melon, sugaring, ripe plums etc., and I gave up hope of ever seeing the butterfly. However, just before we left, one was found doing a "courtship" dance up and down my wife's white cardigan on a washing line outside our caravan. Mrs Firmin netted it, and I later enjoyed taking close-up photographs of it. The Browns of this district are superb, and the butterflies of the Thermal valley have to be seen to be believed. I had one experience here which led to my falling into the river. A solitary Red Underwing (Sp. still unknown), was flying upstream, and popped into a small cave on the opposite side of the river to me, in an inacessible spot above a pool ten or so feet deep. I threw in a brick, hoping to flush it out, and to my surprise out swarmed a cloud of Old Lady moths *Mormo maura* Linn. in their hundreds, and a fair number of the Red Underwings. The cloud was so thick that my first impression was that I was being beseiged by bats, and I dropped my net and slipped gracefully into the water.

Other experiences could be recounted of Arles, Carcassone, or Leucate (where the beautiful Scarce Swallowtail *I. podalirius feisthamelii* Duponchel was common in the camp site), but this would make any article too long.

As a small tip, I bring home a few unset specimens between layers of cellulose wadding(cheap from any chemist), in cardboard boxes, and don't have problems with mould, as one can get the storage in tins or plastic boxes, or indeed with papering. I can, however, thoroughly recommend resting the killing jar, and taking up close-up photography. Storage is less of a problem, and I can vouch for the fact that your interest in Entomology will lose nothing, while insect populations as a whole can only benefit. R. Johnson (4074)

SETTING MACRO-LEPIDOPTERA

Judging by the controversy that was stimulated by Warren Gilchrist's article on setting in the Bulletin of August 1970, it would seem that people's setting methods vary considerably. Therefore I would like to describe the materials and method employed by me. Although this technique suits me, and was mastered quickly, I would not like to guarantee complete success for all users. After all we all have our own preferences and entomology is obviously not excluded from this principle.

Apparatus

The most important item is the setting board, so I will describe this first. All of mine were made at home as the financial saving in buying wood, cork sheeting and contact adhesive over the price of commercial boards is very substantial. The main body of the setting board consists of Parana pine or any similar softwood, with a groove cut down the middle to a depth of approximately 10mms. and a width varying with the width of the setting board. For a 5cm. width board, a groove of width 7mms. should be about right. The groove can either be cut with a plough plane which makes the operation clean, quick and accurate, or failing this a perfectly serviceable groove can be cut by marking the two edges of the groove with a marking gauge and then chiselling out with a narrow chisel. These lines must be emphasised by use of a wide chisel along their length. If this is not done the groove will become ragged and ill-defined.

Alternatively it may be found simpler to construct the board from three separate pieces of wood. The base piece is full width and about half an inch thick. The other two pieces are the same length as the base but are a little less than half the width, so that when they are glued to the base a groove can be left down the middle. In other words these two narrow strips should be half the width of the base less half the width of the required groove. The thickness of the two strips should be equal to the depth of the groove minus the thickness of the cork sheeting used to cover the valley of the groove and the top of the board. It is a good idea to cut these two strips from the same length of wood so as to ensure that they are of the same thickness, otherwise the two top surfaces will not be level.

Whichever design is used for the main part of the board, it will have to be covered with cork sheet, which can be obtained from many toy and model shops or biological suppliers. It is usually sold in pieces one foot square, and is easily cut up with a razor blade and metal rule —preferably not on the dining room table! The cork pieces are glued to the board with contact adhesive, on both surfaces. Finally the boards can be papered.

Formerly for setting papers I used to use greaseproof paper but recently I have discovered a superior product. This new substitute is Cellofilm, which is used to make overhead projector transparencies. Superficially the product resembles cellophane, but is less brittle and more supple than this substance. Because it is transparent, the position of the wings after they have been set can be clearly seen, so that any adjustments can be made if necessary. Cellofilm can be cut into strips 0.6cms. wide and 20cms. long for the inner strips and 1.5cms. wide and 5cms. long for the outer strips.

For holding down the setting strips I use ordinary entomological or even household pins, which are far cheaper. Ordinary pins are far easier to manipulate than Lill pins, and of course they are more readily available.

Finally for moving the various parts of the insect, I use mounted needles which can be made at home, by embedding the eye end of a needle in a balsa handle. One needle is bent so that it has a hooked end. This implement can be used for the legs.

We are now ready to begin setting, assuming a supply of insects, and adequate work space and illumination.

The setting operation

The insect should be pinned accurately as this facilitates setting. Sometimes if a pin is driven in incorrectly and it pierces the wing muscles, the wings become difficult to move and very springy. The pin should lean forward a little and be perfectly vertical when viewed from the anterior. It should be stuck through the highest point of the thorax. The insect is then pinned centrally in the groove, mid-way down the board, so that one can work from the middle to both ends. The box of pins should be left near to hand for later use. When the insect has been adjusted to the right level on the pin (see W. Gilchrist) a pin is placed each side of the abdomen, to prevent spinning during setting. I start setting from the left side because I am right handed, but this is personal preference. Two long narrow pieces of setting paper are now pinned either side of the groove in front of the insect. It is important that the heads of the pins lean away from the worker, otherwise the paper will ride up the pin. The mounted needle, held like a pencil, is taken up and, holding the setting paper just above the wings and parallel with the groove, the left forewing is pushed into position by gentle pressure on the strong vein at the base. I find it impossible to do this from underneath and do not think it is worth the effort anyway. By careful lowering of the setting paper, this forewing can be held in the desired position, while the hind wing is still free. The hind wing is brought into the desired position and then the setting paper is stretched taut and held firmly down on the board. It is then pinned down firmly either side of the wings, and leaning the heads on the same principle as before—to maintain tautness this time. To prevent movement whilst setting the

other pair of wings, and also to prevent curling up of the wings during drying, a wide, short strip should be placed outer to the long strip of setting paper. This strip will need three pins.

This setting operation is repeated for the other side, where a little more resistance may be met with as the first side is being restrained against its will. When the wings have been finally positioned, the two pins either side of the abdomen are repositioned so as to support it horizontally. It is not easy to pin the front pair of legs, so these are brought forward with the hooked needle and rested on the edge of the cork at the top of the groove. Lastly the antennae are positioned by means of pins either side of the clubbed end, leaning over the club to stop it rising during drying. The antennae should be pinned parallel to the front edge of the fore wings. Further insects may be set using the same long strip of setting paper, and the board placed in a safe, unheated box or unusued drawer for two or three weeks. When drying is complete the setting papers must be removed extremely carefully to prevent snapping off the antennae.

P. W. Finbow (4261)

NYMPHALIS ANTIOPA Linn.
A THOUSAND MILES FROM CAMBERWELL

The Camberwell Beauty has in the past received other names, among which may be mentioned "The Grand Surprise" and "The White Border". Ranging from Europe to Japan and North America, its usual name abroad is "The Mourning Cloak". In the course of trying to breed it successfully, I have thought up a number of new names for the species. I fear, however, that they will never appear in print.

This year (1970) *N. antiopa* was on the wing in southern Finland at the beginning of May. My appetite wetted by grand allusions to great tents of caterpillars, and having a particular predilection for Nymphalid caterpillars in general, I spent many an hour with my wife trying to net specimens which were sitting on the large granitic boulders littering the landscape. Eventually we had four safely housed in hanging cages. There they sat, occasionally crisply exercising their wings when the sun shone into the glazed porch of our home, but more often than not sitting like so many dried leaves at the tops of the cages. According to textbooks, having hibernated, they were all females so, other than passing derisory remarks about their sloth and letting my wife poke an inquisitive finger at them occasionally, I left them to their own devices.

They were wont, when the sun came out, to sit around a plastic container charged with sugar solution, imbibing freely, like a lot of classic old maids let loose at a bath of gin. Eventually, pot-bellied and looking most lugubrious, one would slowly raise its middle legs from the pot and flop floorwards, to stagger off, wings askew, into some dimly-lit corner of the cage—whence to stumble up at least a day later, and grope blindly about with its antennae in search of the cherished hooch. This latter, I finally discovered to my horror, had gone quietly alcoholic as the spring progressed.

The potency of the brew can be gauged from the fact that when on 24th May—Old Maid Number One finally got the urge to turn broody, she layed 90 per cent of her yellow eggs clean through the mosquito netting of the hanging cage. These, as the heads of the young larvae developed where their prolegs should have been, were doomed to destruction from the beginning. The bingeing bent of the progenitor notwithstanding, however, the ova in due course produced a mould of most perky appearance.

Two days later Female Number Two, obviously spurred on by the other's last gay fling, gave up its debauchery for an hour and proceeded to spatter practically the whole cage tenderly with eggs. These were so well spaced that after I had laboriously cut away each tiny group an Elk could have passed in and out without anybody being the wiser. On the previous day I concluded life to be extinct in the first female, as wafting even the hellish concoction—now a veritable garden of mould awash with ethyl alcohol—under its antennae sadly failed to elicit the response to which I had become accustomed.

This second batch of eggs turned purplish. This was, I read, quite normal, though at the time I put it down to prenatal disturbances of a nature already alluded to. A fortnight later, just as the first caterpillars were beginning to crawl from their half-eaten egg-shells, a new mould appeared on the scene obviously intent on getting its fair share of what was left of the fermentation products. Unfortunately, aggrieved no doubt at arriving too late to participate in the revelry, this third strain did its best to consume everything, including, by all outward appearances, the mosquito netting. At any rate, unhatched eggs and young caterpillars never even got a sniff at a willow leaf.

By this stage I was feeling thoroughly sick of *N. antiopa*, and was seriously thinking of rechristening it "*acheron*" for its eggs seemed to have the Death's head stamped on every batch. Females number Three and Four were shifted periodically from one cage to another .For a long time they were kept on a diet of very dilute sugar solution, and by and by the foodplant (*Salix* sp.) wilted, turned yellow, then brown, and finally began to fall to pieces at the merest touch of a wing.

Then, one day, being in a more benevolent mood than usual, I wrenched a piece of foodplant from one of the trees in our garden and

stuffed the sprig into the cage. An hour later and both females were happily laying neat rings of ova round the same twig. I gathered up the ova and let the butterflies out through the front door, glad to be rid of them.

The eggs presently hatched, the larvae doing just what I wanted of them: they even actually ate. One moult further up the ladder the sins of the mothers finally caught up with them, and they perished of diarrhoea. I raged, stamped on the container, and after I'd cooled down made a note to keep such larvae sleeved in 1980, when I envisaged possibly having a go again.

The rest of the story is a fair example of how in Entomology one thing invariably leads to another. On July 12th we visited a new forest-meadow. At least, my wife visited it in quest of wild strawberries—I was too busy examining the remains of a bunch of nettles (*Urtica* sp.) with masses of small tortoiseshell (*Aglais urticae* Linn.) caterpillar skins all over them. (Ah! What wonderful beasts *they* are—they breed, they grow, they pupate, and in no time at all there are butterflies galavanting about your cages!) Shortly a storm broke upon us and we returned home. At that time I was passionately spending many an hour vacuum-cleaning the hay-meadows before the farmers were let loose on them—this in association with some population and size estimations I was doing on the Ringlet (*Aphantopus hyperanthus* Linn.). Yes, averred my wife, "*hyperanthus*" was in the wild strawberry meadow too. (Give her her due, she can put a name to most of the species I know.)

On the following day I went back alone, and after putting up a measley group of dejected-looking Ringlets in the first meadow, I followed a rough cart track that cut for about 50 metres through a tongue of spruce forest. In the back meadow I caught a few more before the sun went in for the twentieth time that afternoon. Coming back through the cutting, I stopped suddenly as a lot of black objects in a shiny-leaved willow tree caught my eye. Now, I don't know whether you've noticed this, but willow trees and their kin (Fam. *Salicaceae)* have always got something the matter with them—the blight are into them, or the gall-insects have had a bean-feast, or a smut has given the poor souls a pasting, or, as often in this country seems to be the case, some of the young leaves around the shoots have gone limp and black, like something out of Dracula. It was therefore with a rather jaundiced eye that I gazed upon yet another sickly specimen of this ill-fated crew.

At that point my mind (somewhat surprisingly, considering the heat, the mosquitoes, the Tabanids) performed what I can only describe as a waterfall of calculation—and the "vampire's cloaks" quickly became Eggar caterpillars and then—finally—Camberwell Beauty larvae.

They were clinging in groups to the ends of defoliated branches, occasionally giving a testy flick to one side as a twig brushed against them. The leaves on the tree were small (it was that sort), and the tree being only some two and a half metres tall, and of about the same breadth, it seemed to be covered with great blobs of spiky caterpillar flesh. I fetched a hanging cage from my haversack and proceeded to pick the fully-grown "fruit". They came away quite easily, though few fell to the ground; but make no mistake about it, those beautiful black spines have very sharp tips—no wonder the birds had not molested them. Each larva had a row of rusty-brown marks down its back, and they were really rather handsome insects. It took me almost half an hour to pick them all off, and it was only then that I discovered I was standing in a wet, mossy ditch and that the place was full of mosquitoes!

The ova had apparently been laid on an even smaller bush to the one on which I found the larvae, for both bushes had been badly knocked about and many of the almost bare twigs on the smaller were draped with silk and cast-off skins. A few of the larvae had already attacked a small Aspen (*Populus tremulus* Linn.) adjacent to the willows, and they were tucking into this new species with equal gusto. The cage in which I transported them all home was black with bodies and weighed something terrible.

Arriving home, I surveyed our three aspens (which had already taken quite a bashing from other larvae) and then, with an eye on the hungry hordes, which were already beginning to fidget, I carved off about one-third of a tree and placed the lot in a large breeding cage. They ate ravenously. Two days later they suddenly went mad, crawling over each other in their haste to find a suitable pupating place. By the following day the cage roof (measuring 100 cm x 50 cm) was festooned with their hanging black bodies, and they soon began to shuffle off their skins. How they achieved this I do not know, as there was scarcely room for each larva to twitch its head (there were 240 of them in all). But they succeeded, and slowly the beautiful powdery bloom appeared on the wing cases of the pupae. There they hang now, like so many stalactites on the roof of their cage, waiting for the heat to bring them out.

In a way, I suppose I am still something of a failure, in that I have yet to breed *N. antiopa* from the egg. But to have the thrill of finding so revered a species (even where it is quite a commonplace insect) and to carry home its multitudes of caterpillars, weighing heavily in a bag, is to go back for an instant to childhood days. To know that you have to return some to the back meadow when they emerge — well, that is 1970, and we know more now than we did then.

17.7.70 Leigh Plester (2968)

LETTERS TO THE EDITOR

Dear Sir,

It would appear from the last Bull. Amat. Ent. Soc. that we are to be forced to a division by David Corke's letter requesting us all to write to the Council to express our solidarity with his views on collecting, conservation, and entomological dealers. It would seem important that those supporting different views should also write.

The camera versus the net. I cannot believe that these are alternatives in anything but a tiny minority of cases. The beginner is usually very young (in my case nine, and a colleague maintains to have started at two) and, if price alone wouldn't stop him as it certainly would me, the technicalities of exposure and focusing certainly would. For the specialist, by the time you have photographed top and bottom, with close-ups of venation, tibial spurs, etc., etc., of every interesting specimen, you are running up a formidable score. For the artist-type collector, photography might be a supplement, but, not speaking from experience, I should have thought that the primary art form was the setting and laying out of the collection. As to David Corke's statement "Those with a strong collecting instinct find satisfaction in compiling lists of species they have seen . . ." I may say, with some bitterness, that it is precisely the dedicated collectors who are the worst at providing area lists!

Collecting better known groups. It is just these groups that excite the initial interest in entomology amongst the non-naturalist, and through collecting better known groups that we come to specialise in higher things.

National Trust property, etc., the law. In my experience one may collect *almost* anywhere, with previous permission, without exciting animosity from the arm of the law. Usually people are only delighted that someone is taking an interest in the place. Of course one would never collect on a reserve, but that is a quite different matter. I was once stopped by police at two o'clock in the morning removing my generator and equipment from an army range, and, once it had been ascertained that I wasn't up to espionage, they were only interested in details of my extraordinary hobby.

Leaving for others to see. This point certainly has some truth when applied to the dedicated amassers of vast collections, and to the collectors of rare species. It is quite untrue when applied to the run-of-the-mill collectors taking his one pair of each species. In fact, he is more likely to extend appreciation of the insects by showing them to curious friends, relatives and so on . . . but that is admittedly another point. To deny the young collector his collection of butterflies on these grounds is quite

unsupportable: I am sure nobody could rationally maintain that the collection of a couple of Common Blues, or Gatekeepers or Peacocks or Small Tortoiseshells, especially if he has bred them himself, could possibly harm wild populations.

Public Image. The public image of entomologists is exceedingly uninformed and bears little relation to reality, or, I regret to say, to policy stands by the AES. What does matter though, is that there is someone competent in the taxonomy and ecology of insects to advise on conservation matters—and the plain facts are that he is most likely to be a collector sens str.

Commercial exploitation. I feel most strongly on this point. None of us, I think, started entomology with Critical Species or Microlepidoptera. We started with Peacocks and Giant Atlas Moths. If I had not been able to breed exotic silk-moths when I was fourteen, I am reasonably certain that I wouldn't be a moth-man now. I think it is a reasonably tenable statement that the commercial entomologists are doing more in promoting entomology in the young than any amount of insect photography or talk of conservation. It will not have escaped your notice that the managing director of Worldwide Butterflies Ltd., our biggest commercial concern, was also prime mover of the British Butterfly Conservation Society, and remains a driving force in it. In fact the biggest commercial entomologists in tropical countries are those of Formosa, and they have been operating for very many years, not on entomologists who remain a tiny proportion of their trade, but on the decoration business, and there is no evidence that the butterflies of Formosa are any the worse for it. In fact *Atrophaneura horishanus*, Boisd., I am reliably informed, has changed in status from a very rare butterfly to a common one, following the planting of its foodplant by the collectors. As far as advertisements in the AES bulletin are concerned, I believe they play a very important role in informing beginners of their existence. In summary I believe it would be lunacy of the first order to persecute the commercial entomologists.

I am acutely aware that these remarks make very boring reading, but I justify them on the grounds that, as George Thomson remarked in the same Bull. Amat. Ent. Soc., "the entomologist working on the analysis of hundreds of specimens of a species or group is more likely to be working quietly away, his voice being heard only when the results are published". It is manifestly not going to harm the serious entomologist, scientific or artistic, if the AES takes a stand against those things outlined above, but I believe that, in the long run, it is the ranks of enthusiastic juniors who will feel the pinch.

Richard Dickson (3674)

Dear Sir,

I was astonished to read the quite discourteous letter by L. G. Waddington on Commander Gilchrist's article on setting in the November *Bulletin*. It would appear that he has not properly read the opening part of the article; I will therefore reiterate the relevant lines: "I have developed a setting process which suits me, and which would like to pass on to other beginners, in the hope that it may help them. I must stress that this method will probably need modification to suit any other individual." Mr Ford's book "Practical Entomology" is an excellent work. I have it, I use it, and I have learnt a great deal from it. But neither this work of Kirby's or Mr Waddington's own method is Holy Writ, to remain unchanged. If one took twelve lepidopterists one would I am certain find that they used twelve different methods varying slightly, but that the end product was the same, they had reached their goal by different paths. I know this because I am acquainted with several lepidopterists and have envied their collections, and on questioning them about their methods (to improve my own) find their ways vary. I have seen Commander Gilchrist's work and know that his own method produces the desired result.

I am sorry to disagree with Mr Siggs who is a much better entomologist than I shall ever be, but I regard expanded polystyrene to be an invention of the devil. It ranges widely in its consistency and quality, and has the disadvantages that because of its electro-static properties, the wings of the smaller and more fragile moths will adhere to it and can be damaged. Never use this material for store boxes, cabinet drawers, or when transporting for exhibition purposes. To do so is a recipe for disaster, as I have found to my bitter cost. It is not sufficiently dense to provide a good hold on the pin, it will warp badly, and if Paradichloro-benzine is used it will evaporate into thin air. I agree that natural cork has its defects, fissures and resin, and it will get very hard in time and grips the pin too tightly after many years. Balsa wood has the defect of natural wood, it will "run off" into hard patches and has sometimes lines of hard grain in it. Over the years I have found that the reconstructed granular cork in sheets $\frac{3}{4}$in. thick with the proviso, that here again we get many qualities and prices and you only get what you pay for is best of all. I would not recommend tracing paper, it comes in many varieties and some of it has a "greasy" surface which will take the scales off delicate wings.

If I may now offer a little advice from personal experience and failure. Never, never scrimp on your equipment, setting boards, etc., don't try making them, it will not even pay in the short run. Buy as large a variety of setting boards and pins from your dealer as is available, remember that moths and butterflies don't come in three sizes, large, medium and small. If you go out and catch twelve different moths it is better to have them pinned one each on twelve different boards,

than twelve badly held on one. I cover my boards with graph paper, a suitably sized piece laid on top of it and then pressed into the groove with a steel rule. When dry I polish it with the bone handle of a knife. After three pinnings I soak off and clean out the groove and repaper. After three pinnings you will find that there are about 120 holes in an average board, and under a magnifying glass they look like the surface of the moon. The damping will expand and fill up the holes in the cork, and also get rid of any mites that may have taken up residence in the grooves, and believe me they do very soon. Never use setting paper twice. After all a large sheet of graph paper costs only a few pence and setting paper a few shillings a box, so is there any sense in travelling a couple of hundred miles and spending several pounds on fares to get a specimen of *F. carbonaria* The Netted Mountain Moth, or *T. brunneata* The Rannoch Looper to spoil them for a little extra care and a piece of setting paper cosing about a tenth of a penny.

I confine myself almost wholly to the Geometers. And my advice with these would be, always set straight after killing, they do not relax well and the most difficult of all I would say are the Sterrhinae (The Waves). In fact I would say it is better to confine the number taken at one time to those that one can set straight away.

G. Prior

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THE CASE FOR COLLECTING

To suggest that working on only living creatures and using a camera can serve all or even most "useful scientific purposes" is being, I suggest, short-sighted (see "The Case Against Collecting" Bull. Am. Ent. Soc. **29**: p. 112). Perhaps Mr. David Corke could suggest how one can be sufficiently objective to be able to compare a group of population samples over a period of years without having the actual specimens side by side. Colour photography is simply *not* consistently accurate for systematic studies. Possibly he does not consider the micro-morphology, cytology or study of geographical variation (and thus evolution) important—though I cannot believe that. The simple fact is that the latter cannot be studied fully and the other two important sciences cannot be studied *at all* without the collection of specimens.

Mr. Corke unfortunately makes the mistake of comparing ornithology with entomology. I do not believe that by comparing the admirable approach of many, but by no means all, ornithologists with the so-called "catalogues of death" he makes a case for outlawing the

collecting of "better-known groups", implying that we know enough about them already, when the reverse is the case. The better known groups, such as the butterflies, provide us with the material for constructive and practical research which would not be possible if the "bug-hunters" hadn't already made their collections and, if you like, "catalogues of death". He must be aware of the work of Professor E. B. Ford, yet he categorically states that the "collection of better known groups of insects serves no useful scientific purpose which could not be served more easily by methods other than collecting". Need I say more?

To a certain extent I agree with Mr. Corke's views on the Entomological dealers—although it must be remembered that they make their contribution by supplying livestock for research. Unfortunately, one is led by some of the activities of one of our largest dealers to wonder if their heart really is in the right place when they claim an interest in Butterfly Conservation yet have themselves revived the abominable practice of selling jewellery made from the wings of irredescent Lepidoptera.

Perhaps he should have also read Professor Ford's notes on population fluctuation due to climatic and other environmental factors. The numerical difference from one year to another in a single population is so great that the numbers required for study is microscopic by comparison. Fortunately, it is often the case that the very variable species (requiring a larger sample) are also numerically strong within their own habitat.

I am one of the very few but growing number of people who believe that one of the greatest dangers to civilisation through pollution is the destruction or extinction of the insect fauna. The insects fill such an extensive and comprehensive ecological niche that major imbalances in their numbers have immediate implications for man and his environment. One need only quote the locust and the mosquito. To come to terms with such dangers we must continue to study the effects of pollutants on these organisms so that we can effectively control them without endangering human existence on this planet—which does not mean, as some would suggest, eliminating the "undesirable" species and keeping these which are "attractive" or "useful" as far as we can tell. It happens that butterflies are excellent subjects for such work. The inter-relationships between the biological sciences make demands which can only be satisfied by population and micro-biological studies involving the collection of samples.

Even to suggest that such activities be restricted to "useful scientific work" would not only be impractical, but we do not have the infinite wisdom to determine in advance which collections are likely to be so, or to say who is or who is not likely to make a contribution of this

nature. For these reasons I would appeal to our members not to support Mr. Corke's suggestion of a pronouncement against collecting British Butterflies which, although made with good intentions, is misguided and extremely short-sighted.

20.1.71 George Thomson (3689)

VANESSA ATALANTA Linn.

Referring to my report *Bull. amat. Ent. Soc.* **29**: 67, on the appearance in my garden of the Red Admiral (*V. atalanta* Linn.) on the 11th January. Mr R. J. Swindells very kindly pointed out the fact that I had omitted to state where my garden is situated. I do apologise for omitting this important information, and so to put the record straight I live at South Woodford which is a suburb of East London. Unfortunately I have to report that the butterfly did not survive the winter.

E. H. Moss (3013)

HON TREASURER'S REPORT

Reviewing the accounts for 1970 the Hon. Treasurer pointed out that there had been an increase in subscription income, due to the increase in membership, and the surplus from the Annual Exhibition showed a small increase. The temporary surplus of cash arising after receipt of subscriptions early in the year was now being placed on deposit until required in order to earn a small amount of interest.

Against this rise in income there had been small increases in various items of expenditure; there had also been the non-recurring expense of the Conservation Year Exhibits. The resulting overall surplus for the year of £294 was only £5 less than for 1969. The Society could expect in 1971 an increase in the cost of printing the *Bulletin* and of course there had been a recent increase in postage rates but there should still be another fair surplus at the end of 1971 to add to the General Fund.

The balance sheet as at 31st December 1970 reflected the Council's decision to separate the Publications Fund from the General Fund. In future all profits on sale of handbooks, pamphlets and leaflets would be added to the Publications Fund and reserved specifically for producing future publications. A new duplicator had been purchased during the year and was included on the assets side of the balance sheet.

BOOK REVIEWS

PROVISIONAL ATLAS OF THE INSECTS OF THE BRITISH ISLES. Part 1. Lepidoptera Rhopalocera (Butterflies). Published by the Biological Records Centre, Monks Wood. 1970. Edited by John Heath. (Available only from E. W. Classey Ltd. at 50p.)

This is Part 1 of what one hopes is to be a series of surveys which will cover all the British Lepidoptera. There is an introduction by the Editor, our member John Heath, an index and 57 maps of quarto size. The maps have been prepared using the methods evolved for the "Atlas of British Flora" published in 1962 and are compiled from records received by the Centre up to December, 1969. Only resident species are included and there are maps for each species with one map showing the distribution of the food plants of the Brimstone, *Gonepteryx rhamni* Linn. A solid spot indicates a verified record within the 10km square between 1960 and 1969 while an open spot indicates a record pre-1960. In practice this will prove a most important guide for those concerned with conservation of local species and should encourage more observations into the distribution of our Butterflies and the ecological reasons for some of the distribution patterns. It is intended that up-dated maps will be issued from time to time. The Biological Records Centre is to be congratulated on the standard of this production both in presentation and clarity of content. It will certainly be a new addition to the library of all those who have an interest in our British butterflies.

P. W. C.

INTRODUCTION TO THE STUDY OF ANIMAL POPULATIONS by H. G. Andrewartha, Second Edition. Published by Methuen in soft back at £2.60.

Written as an undergraduate textbook it was designed to supplement the course in animal ecology as taught by Professor Andrewartha at Adelaide University. It is divided into two sections one theoretical, the other practical. The first section gives a comprehensive survey of the components of the environment and its effect on animal populations. The second part is concerned with the estimation of populations, the problems of distribution and dispersal. There are also sections on the physiological responses of animals to temperature and their behaviour in relation to food and moisture. The examples used in the practical section are mostly entomological and involve a variety of readily available species.

This is however a textbook intended to be used by students who I suspect have been given a supplementary course on statistics or whose mathematics is up to "A" Level standard.

J. B.

WEST AFRICAN BUTTERFLIES AND MOTHS by John Boorman. Published by Longman in soft back at 75p. (79 pp. and 16pl. in colour.)

There has long been a need for information about the rich insect life of West Africa in the form of an easily obtainable handbook. This book has sampled a few of the commoner species of Butterflies and Moths and is to be welcomed in the absence of others. Like so many Butterfly books little is said about habits, larval stages or foodplants possibly because little may be known of many of the species described. The few line drawings are excellent, the colour photographs are also good but some of the black and white photographs are little more than silhouettes. A major criticism of this book is the lack of an index and the inconvenience of having to search through the text for information on a particular insect. Because of lack of competition this book is likely to find a wide market and one can hope that it will be successful enough to encourage those concerned to produce something bigger and better.

J. B.

THE PROFESSOR HERING MEMORIAL RESEARCH FUND

The British Entomological and Natural History Society announces that awards may be made from this Fund for the promotion of entomological research with paraticular emphasis on:—

(a) Leaf miners,
(b) Diptera, particularly Trypetidae and Agromyzidae,
(c) Lepidoptera, particularly micro-lepidoptera,
(d) General entomology,

in the above order of preference, having regard to the suitability of the candidates and of the plans of work proposed.

It is envisaged that the awards would be made to assist travelling and other expenses necessary for field work, for the study of collections, for attendance at conferences, or for exceptional costs of publication of finished work. In total they are not likely to exceed about £100 in 1971 or 1972.

Applicants should send a statement of their qualifications, of their plan of research, and of the precise objects for which an award is sought, to R. F. Bretherton, CB, MA, FRES, Hon. Treasurer, Folly Hill, Birtley Green, Bramley, Surrey, as soon as possible and in any case *not late than 30th September 1971.*

Applicants need not be resident in the United Kingdom, and research in any part of the world may qualify.

This is the second year that this annual award is to be made.

ADDRESS CHANGES AND CORRECTIONS

ARMYTAGE, T. (4316), 311 Cemetery Road, Sheffield, S11 8FS, Yorks.
BELL, A., M.A. (3122), Little Stockings House, Little Berkhamstead, Nr. Hertford, Herts.
BENHAM, B. R. (4393), 35 Hayling Avenue, Feltham, Middx.
BOSWELL, Dr. P. A. (4100), Flat 87, 6–9 Charterhouse Square, London, E.C.1.
BROOM, P. L. (4188), 10 Ellerton Road, Tolworth, Surrey.
BROWN, A. J. (3854), 64 Strouden Avenue, Charminster, Bournemouth, Hants.
CARTER, D. J. (3411), 51 Hollies Avenue, West Byfleet, Surrey.
COCK, J. W. (4450), South Park Lodge, Carlton Road, S. Godstone, Surrey.
COLLIER, Major A. E. (1066), Stubbs Spinney, New Park Rd., Cranleigh, Surrey.
DANKS, Dr. H. V., F.R.E.S. (2907), 1470 Morisset Avenue, Apt. 30, Ottawa, Ontario, Canada.
DAPLING, J. G. (3600), 44 Elm Tree Park, Yealmpton, Devon.
DILLON, T. (2665), P.O. Box 553, Accra, Ghana.
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FISHER, R. E. G. ( ), 8 Saxon Close, Godmanchester, Huntingdon, Hunts.
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GODDARD, P. A. (2206), 12 Nightingale Road, Guildford, Surrey.
GOODING, D. G. (4230), 72 High Street, Sidford, Sidmouth, Devon.
GRIMSELL, D. (3855), 21 Tyrone Road, Thorpe Bay, Essex.
HALL, J. G. (4459), 7 Burwood Avenue, Eastcote, HA5 2RY, Middx.
HAYNES, R. F. (834), 130 Fairfield Drive, Dorking, Surrey.
HOLLOWAY, L. G. (4018), Sheewaters, off Willowhale Avenue, Aldwick, Bognor Regis, Sussex.
JANES, C. T. (1635), 112 Roundhills, Waltham Abbey, Essex.
JORDAN, E. (4337), 20 Arthur Street, Prestwich, Manchester, M25 7HS, Lancs.
KEEN, A. R. (4301), Nant Isa I, Crafnant Valley, Trefiew, Caernarvon, Wales.
KEESING, J. L. S. (4414), 21 Cedar Avenue, Whitton, Twickenham, Middx.
KERR, J. A. (4136), Frocester Lodge, Nr. Stonehouse, Glos.
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LYTH, P. R. (4082), 1 Seafield Road, Lytham St. Annes, Lancs.
MALLETT, B. J. (4367), Central Medical Labs., P.O. Box 1900, Wusikili Hospital, Kitwe, Zambia.
MARREN, P. R. (4049), 3 Tedder Close, R.A.F. Andover, Hants.
MOON, D. J. (3850), 26 Brentford Close, Queensway Estate North, Wellingborough, Northants.
MORTEN, H. (3637), 12 Kelham Lane, Newark, Notts.
PRATT, C. B. (784), 79 Barnhorn Road, Little Common, Bexhill, Sussex.
PRICE, J. M. (3978), 10 Bishopton Lane, Stratford-on-Avon, Warwicks.
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SANGSTER, D. (4238), 29 Highfield Way, Potters Bar, Herts.
SCOTT, D. W. (2783), 52 Meadow Rise, Trimpley Lane, Wribbenhall, Bewdley, Worcs.
SHEPPARD, D. A. (4205), 11 The Green, Heston, Hounslow, Middx.
SMITH, J. K. (3795), 31 Dunedin Avenue, Stockton-on-Tees, Teeside.
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SUTTON, G. R. (237), 92 Chalkwell Lodge, London Road, Westcliff-on-Sea, Essex.
TAYLOR, B. J. (4274), 127 Sherborne Road, Yeovil, Som.
TAYLOR, P. (3571), 19 Conway Road, Hounslow, Middx.
TURNER, P. J. (4164), 37 Twyford Avenue, London, N.2.
WAINWRIGHT, M. (4553), Emroyd, Rode Lane, Carlton Rode, Norwich, NOR 03X, Norfolk.
WANKHAR, D. (4156), Anand Bhavan, Laitumkhraha, Shillong, 3 Assam, India.
WATKINSON, Dr. I. A. (3130), Windrush, 2 Fairleas, Sittingbourne, Kent.
WEBB, P. E. (3526), 36 James Close, Basingstoke, Hants.
WRAGG, G. (4196), Albury, Milne Meadow, Stock, Essex.
Transfer of membership. From H. Riley (1819) to:
RILEY, J., F.R.E.S. (1819), High Green, Great Maulton, Norwich, NOR 78W, Norfolk.

GUIDANCE FOR AUTHORS

All authors of articles for the *Bulletin* are requested to follow these guidelines. Very short notes, articles by junior members and solicited articles can be retyped by the editor, if necessary, but articles by adult members which do not follow these simple rules may be delayed until the editor has time to type them.

(1) All material should be type-written, double spaced, with wide margins on *one side only* of quarto or A4 size paper. Author's corrections to his typescript should be in pencil.

(2) The title should be in capital letters throughout and must not be underlined. Please choose a title which will make reference easy when your article is indexed.

(3) The author's (authors') name(s) followed by AES membership number in parentheses, should be placed at the end of the article, on the right hand side, on a different line from the text, and not underlined.

(4) All living organisms, where exactly identified and relevant to the article, should be given their full scientific name. (Only if the article is of literary rather than scientific interest should mention be made of irrelevant, unidentified organisms.) The full scientific name consists of the name of the genus and species followed by the name of the author. The generic name has a capital initial letter and the specific name a small initial letter, both names must be underlined. The name of the author may be abbreviated if well known but single letter abbreviations are not used.

(5) If you wish well known English names may be used in addition to the scientific names. Either of the following forms is permitted: '*Pieris brassicae* Linn. (Large White Butterfly)' or 'The Large White Butterfly (*Pieris brassicae* Linn.)'. English names should have a capital letter for each word in the name. This does not apply if the name is used as an adjective, e.g. 'yew hedge'.

(6) Once fully named an organism may be referred to by its English name alone or by its scientific name which may be abbreviated as in the following example: *P. brassicae*.

(7) If the name of a genus is used on its own it should be underlined and followed by 'sp.' (singular) or 'spp.' (plural). These abbreviations for species should not be underlined, e.g. *Pieris* sp.

(8) Abbreviations should be followed by a full point (.) *only* if the last letter of the word is missing, e.g. Mr for Mister but Linn. for Linnaeus. Ciphers such as AES and BBC should not have full points.

(9) Any published work which is mentioned in the article should be referred to only by author and date of publication. Either of the following forms is acceptable: 'Ford (1955) states that . . .' or 'It has been found that . . . (Yarrow, 1955)'. All the references must be listed on a separate sheet at the end of your typescript. References should be listed alphabetically by author and should take the form exampled below:

FORD, E. B. (1955). *Moths. New Naturalist Series.* Collins, London.

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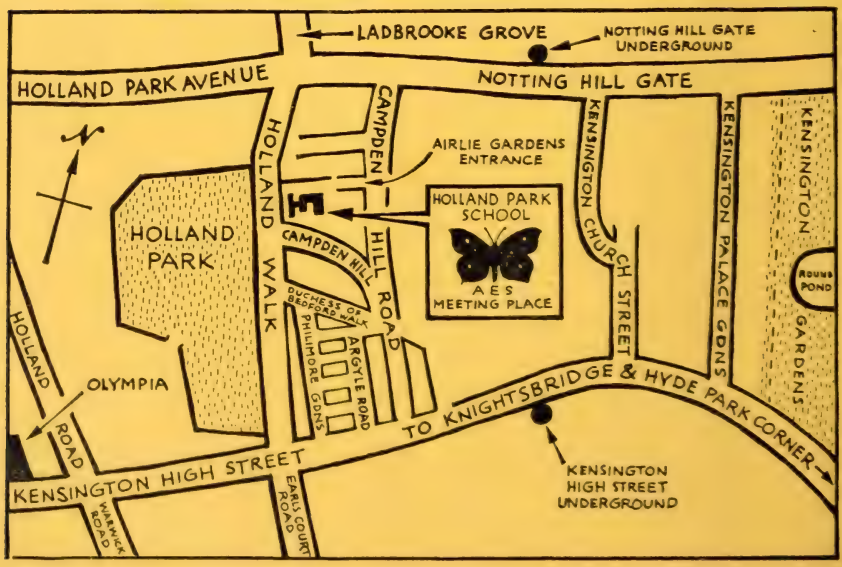

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NOVEMBER, 1971

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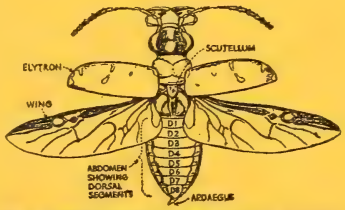

FIG. 2.—*Cicindela campestris* L., male. The Common Tiger Beetle (Adapted after Gangibauer.)

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No. 293
NOVEMBER 1971

EDITORIAL

So another exhibition has passed successfully. This year there were more trade tables than ever before, and there is no doubt that for many members this opportunity to buy equipment, books or specimens was most welcome. There has however been some concern expressed about the quantity and quality of members exhibits. Maybe there is scope for some new approaches. For example a competition for the best examples of bred (not just reared wild stock) insects of a variety species. I have often thought that my own speciality, the Saturniids would lend themselves well to this sort of competition and one would hope that this might encourage others to go on to study and rear some of our less well known insects. Should you have ideas on this or on any other aspect of the exhibition please let us know.

A reminder that there are several changes of address of members of council. Please note the name and address of our new treasurer who is Mr G. A. Henwood. Any correspondence sent to the retiring treasurer's address is unlikely to receive attention for the next six months!

Finally, I shall shortly be giving up the job of editing the *Bulletin*. Would those interested in the post of Editor please write either to me or to the secretary.

John Bocock (4211)

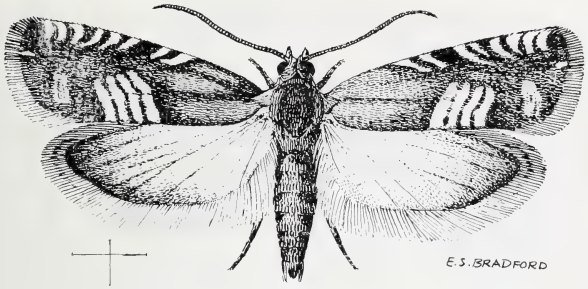
COLLECTING NOTES — NOVEMBER 1971

The Smaller Moths

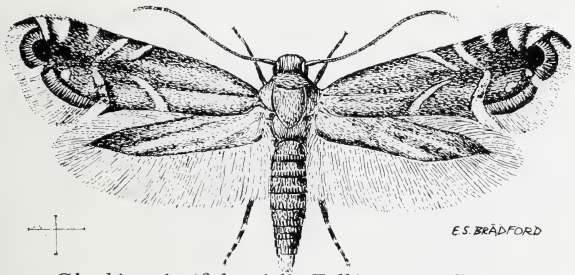
The editor likes his copy for the November issue by the 1st August. Now I don't unduly mind writing this article during the entomologically leisurely winter months but at the height of the season, when one is struggling to keep pace with field work and with feeding or setting the results, authorship becomes rather a "bind". As usual, I have cut it fine and now at 11 p.m. on the 29th July I am writing this in the middle of Wicken Fen, sitting beside my sheet and paraffin pressure lamp. Hereby I am discharging two rather tedious duties at once, for collecting with a light is second-rate entomology, telling you little about the species taken except that they are there. It has its place mainly as an aid to the compilation of local lists.

Whenever possible I like to select from Mr E. S. Bradford's drawings those that depict species to be sought during the quarter following publication. However, it is difficult to find suitable candidates for mid-winter and those I have chosen are not likely to be found in the period from November to January. The first is one I would look for in October, though, as I shall say, it is possible that the full-fed larva could also be found in the winter. This is *Cydia* (*Grapholita*) *compositella* Fab., one of the smallest and most charming of the *Tortricidae*. The larva feeds in the seed heads of clover (*Trifolium* spp.) and I have reared it quite by chance. In October 1970, I collected Clover heads in which there were larval cases of *Colephora deauratella* Lien. and kept them out of doors in a flower pot through the winter. *Compositella* was a welcome bonus. The first I knew of its presence was when the moths emerged the following June: I saw neither larva nor pupa. Our authors are silent on the insect's method of overwintering. Possibly the larvae remain in the seed-heads, in which case a bagful collected in the winter should yield imagines the next summer, for *compositella* is quite a common moth.

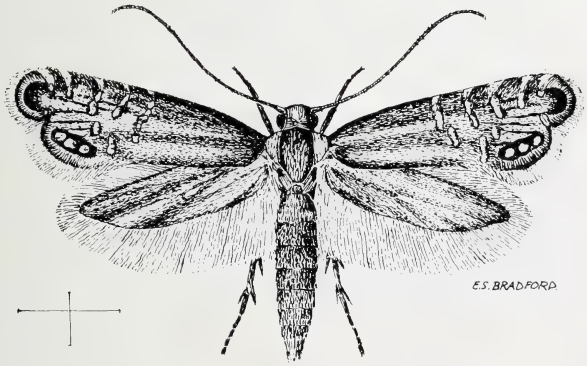
The other two pictures are of members of the *Glyphipterigidae*, a family not previously shown by Mr Bradford. Some of them have been called "Fanners" because of the way in which they vibrate their wings when at rest—they fly in the sunshine. The first is a species which has had trouble over its name. Formerly known as *Glyphipterix fischeriella* Zell., its name was changed to *cramerella* Fab. But now it appears that it is not *cramerella* at all, which is a good species, but one not found in Britain and the senior name which we must now use is *simpliciella* Steph. For further complication, Stephens thought the two species were involved and named the "other" one *cognatella*: but we can forget about that. This troublesome little moth is one of our commonest insects. The imagines swarm in late May and early June, but are seldom noted because they are so minute. The larvae feed in July on the seeds of Cocksfoot Grass (*Dactylis glomerata* Linn).



Cydia (*Grapholita*) *compositella* Fab.



Glyphipterix (*fishceriella* Zell.) *cramerella* Fab.



Glyphipterix (*Aechmia*) *thrasonella* Scop.

The other moth depicted, *G.* (*Aechmia*) *thrasonella* Scop., is more local, but common enough in many damp localities throughout the British Isles. The larva, which I have not yet looked for, is said to feed in the spring on the stems of *Juncus* spp.

Let us now proceed to a close relative of the last two moths, *G. haworthana* Steph., for it is one which offers a chance of field work during the winter. The larvae feed in the heads of Cotton Grass (*Eriophorum* spp.), pupating in the feeding place in the spring. The

seed heads may be picked any time during the winter. The best treatment is to put the heads in a cloth bag or nylon stocking and hang it up out of doors. I have bred the moth from Cheshire but have not yet come across it in the south of England though doubtless it occurs there in suitable spots. The moth flies in May.

The larvae of several Gelechiids remain in seed heads throughout the winter, pupating there in the spring. *Metzneria lapella* Linn. may be bred from the heads of Burdock (*Arctium* spp.) and *M. carlinella* Stt. from Carline Thistle (*Carlina vulgaris* Linn.). Both these moths are local but abundant where they occur, there often being several larvae in each head. The latter betrays its presence by causing the thistle head to have rather a shaggy and unkempt appearance. I have bred both very freely from material collected at Portland Bill. *M. metzneriella* Stt., which lives in the heads of Knapweed (*Centaurea nigra* Linn.) is more widely distributed but thinner on the ground. You will probably have to work hard to find enough tenanted heads to provide you with a series.

If Tansy (*Chrysanthemum* (*Tanacetum*) *vulgare* Linn.) grows in your area, look in the stems just below the dead flowers. If you find larvae there, they will probably be those of *Isophrictis tanacetella* Schrank, which have retired into the stems after feeding on the seeds in the autumn. This moth occurs in the London area. Seed heads of Fleabane (*Pulicaria* (*Inula*) *dysenterica* Linn.) collected almost anywhere will provide *Apodia bifractella* Dup. and possibly also the more local *Ptocheuusa paupella* Zell. Perhaps you will be gathering the plant in any case "The juice of the whole plant cures the itch, applied externally, and the very smell of the herb is said to destroy fleas" (Family Herbal by Sir John Hill, M.D.—circa 1770).

Though many Tortricid larvae feed on seeds in the autumn, relatively few overwinter in the heads. An example that at once springs to mind is *Endothenia gentianaeana* Hubn., which remains in Teasels (*Dipsacus* spp.). *Cochyllis roseana* Haw. also stays put in the same plant, spinning up amongst the seeds. Spun heads of Yarrow (*Achillea millefolium* Linn.), especially in coastal districts, may contain larvae of *Aethes margaritana Haw.* (*dipoltella* Hubn.), while heads of Wild Carrot (*Daucus carota* Linn.) as well as other species of Umbellifers may be tenanted by the larvae of *Cydia* (*Laspeyresia*) *gallicana* Guen. (*rufillana* Doubl.).

I must admit that I did not finish writing this in Wicken Fen, though it was there that I broke the back of the task. It was one of those warm, damp, windless nights when the moths come thick and fast and before long I found I had little time left for my pen. At 1 a.m., in spite of ever-increasing traffic to the sheet, a craving for bed outweighed my entomological zeal. Already I had added five new species to the Wicken list and confirmed two more for which there were no recent records. So I sped home, feeling well satisfied with part, at any rate, of the night's activities. A. M. Emmet (1379)

ALPINE COLEOPTERA

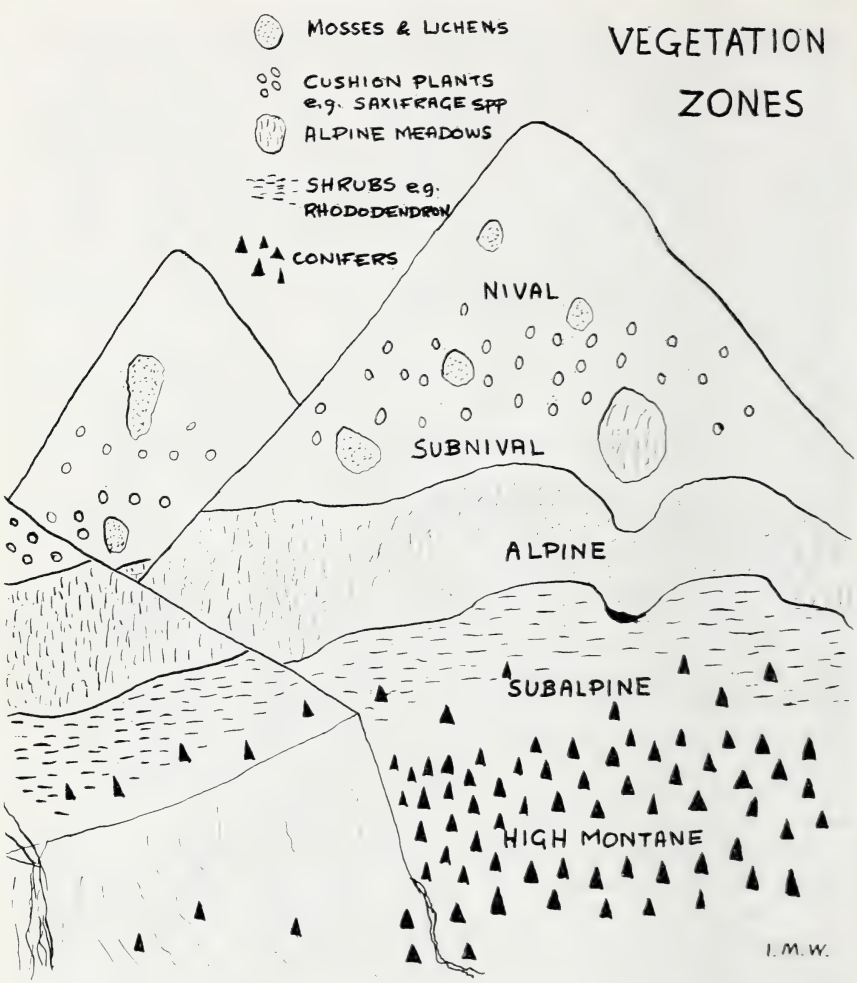
When I went on my first trip to the Alps I took what I would call the usual collecting equipment consisting of a rubber sheet, sweep net, pooter and plenty of tubes for the bigger specimens, not forgetting the killing bottle. I have now collected abroad three times and have in each case tried a different method of storage. At first I used pieces of cellulose wadding in envelopes, each containing one day's collection from a particular locality. On arrival home each envelope was dampened and then the setting of the contents was carried out within twenty-four hours. On that occasion I was collecting at Serfaus in the Austrian Tyrol (1969).

In 1970 I visited Grindelwald in the Bernese Oberland, Switzerland, during the last two weeks in July. On this occasion I took four tobacco tins each containing several layers of cellulose wadding. At the recommendation of the staff of the British Museum (National History) I placed a few small crystals of a cresol compound in the bottom of each tin plus a few drops of ethyl acetate. I found that this kept a good relaxing atmosphere. When I got home I then had to set all the holidays specimens in one foul swoop.

This year, just a few weeks before going to St. Niklaus in the Valais, Switzerland, I had an old box of Lepidopterist setting boards given to me. I replaced the setting boards with pieces of hardboard covered with expanded polystyrene to take carded beetles. By taking the minimum of setting equipment the job was completed whilst away. The only problem came with the small things which required a microscope, but the all important rule here was not to risk a glue covering on the upper surface of the specimen. The arrangement of appendages may only be carried out if there is no risk of this occuring.

I had somehow to obtain textbooks for Central European Coleoptera. In Austria I tried various secondhand booksellers to see what was going. After mastering the pronounciation of the word käfer, I got some strange looks on asking for books on the subject. I was to discover later that Cassell's German/English dictionary gives two meanings for the word. The correct meaning is certainly beetle, but the second is Germanic slang for "young girl or wench"! The search was rewarding however for I got a clean and unfoxed copy of Reitter (1908) volume one which covers the Adephaga. Since then I have been given volume four on the Chrysomeloidea. For alpine collecting these are the most useful volumes. On each holiday I have taken Bechyne (1956), which gives one some idea as to the identity of the unfamiliar non British species.

I have always regretted not having a book giving the high alpine and nival species. The term alpine referes to the zone between the upper limit of trees (tree line) and the line of the lowest permanent summer snow. The nival zone lays above this line. However on the last day of my holiday this year I bought a very good general book by



Alois Kosch (1966), giving the alpine flowers and a whole range of animals, including just under fifty species of beetles. For each animal it gives the recorded altitude range, on a histogram in the top corner of each page. It also gives a good diagram of the vegetation zones in the Alps, the altitudes of which vary greatly from place to place and also from north to south of a mountain. The vegetaation zone in which a species occurs is therefore much more important than just altitude.

The dense natural forests on the steep slopes, and the lush hay meadows around the high mountain resorts, come within the high montane zone. These were my most productive collecting regions in the mountains. The upper limits of the zones are at much greater altitudes in the Valais than in either the Bernese Oberland or the Tyrol.

Added contrast was made by the fact that the 1970 seasons were very late and in July it was still spring at Grindelwald. In the Valais this year and in Austria in 1969 they were harvesting the hay whilst I was there, whereas last year the hay meadows were lush with everything from Orchids and large Umbellifers to Thistles notably *Circium spinosissimum,* Linn. So many large beetles presented themselves that little time was left for hunting out smaller species. At Grindelwald Grund (alt. 1000m) I found a large red and black Clerid, *Trichodes apiarius,* Linn. (not Brit.). I also took this at Serfaus (alt. 1400m) on *C. spinosissimum,* Linn. *T. alvearius,* Feb. (not Brit.) is also reputed to be common in the Alps but I have not found it yet.

The Umbellifers were the most productive plants in the hay meadows around Grindelwald (alt. 1250m). At Grindelwald Grund I spotted a curious looking "Bee" on one. A second look showed my mistake, for it was *Trichius fasciatus,* Linn. Other Cetonines found were *Phyllopertha horticola,* Linn. *Hoplia farinosa,* De Geer (not Brit.), *H. philanthus,* Fuessly, *Gnorimus nobilis,* Linn. and *Potosia cuprea,* Fab. Longicorns were also common Umbellifers and other white flowers, the most common being *Pidonia lurida,* Fab. (not Brit.), *Judolia cerambyciformis,* Schrank and *Gaurotes virginia,* Linn. (not Brit.). Other species found were *Pachyta quadrimaculata,* Linn. (not Brit.), *Leptura sanguinolenta,* Linn., *Strangalia melanura,* Linn., *Alosterna tabacicolor,* DeGeer and *Molorchus minor,* Linn. These were not of course the only things to be had in the high montane zone. At Grindelwald *Malachius aeneus,* Linn. seemed to be flying around everywhere and I often saw *Cicindela silvicola,* Latreille (not Brit.) in flight.

This year at Saas Fee in the Valais (alt. 1800m) I found *Cicindela gallica,* Brulle (not Brit.) in the subalpine zone, which lies where the trees thin out above the high montane zone until there are no more. Above Zermatt, Valais (alt. 1700m) on a fallen log within this zone *Ips cembrae,* Heer was found. This species was first found in Britain a few years ago near Aviemore (Massee and Gardner 1963). Three species of *Staphylinus,* Linn, were found below the tree line. Firstly in Serfaus I let two very active large specimens get away, which I believe were *S. caesareus,* Cederjhelm. However at St. Niklaus I finally took this species. *S. stecorarius,* Oliver was very abundant in the Nikolaital Valley, but due to a lack of readily available tubes on first finding this species, I let yet another get away. This time it was the first Buprestid I had ever found. At Grindelwald one specimen of *S. erythropterus,* Linn, was found running across a pathway and this seems to be the most usual method of spotting members of this genus.

The term alp really means a high mountain meadow, generally used for summer grazing, and as these are included in the next vegetation it is appropriately called the alpine zone. The transitional area between the alpine and the nival zone is called the subnival zone. Reitter (1908) gives a total of thirty Central European species in the genus

Carabus, Linn., which is at least twice the number on the British list. Therefore it is easy to find several interesting and unfamiliar species in the Alps particularly in these higher zones. In Austria I found *C. concolor var. sylvestris*, Panzer (not Brit.) running from under stones. Near Station First, which is above Grindelwald, I found *C. concolor*, Panzer (not Brit.) under cow claps and stones. Also under stones in this region were *C. fabricii*, Panzer (not Brit.), *C. violaceus*, Linn, and the dead remains of *C. auronitens*, Fab. (not Brit.). The other *Carabus* sp. found was *C. monilis, Fab.* which greeted me in my room one night.

I have not mentioned the great variety of Chrysomelids which show themselves at all levels on the mountainside. In Austria *Chrysolina coerulans*, Schaller (not Brit.) was observed in very large numbers. At Grindelwald Grund and again this year at Saas Fee I found *C. fastuosa*, Scopoli. *Thymus* spp. are common plants but *C. cerealis*, Linn. which feeds on them is far from being equally so. In Britain it is known only from a few high peaks in Snowdonia. I have only found this very beautiful insect at Serfaus and while travelling home through the Vosges, France. *Chrysochloa*, Hope (all non Brit.) is a genus very closely allied to *Chrysolina*, Reichenbach but very much harder to identify. Out of the eighteen species given by Reitter (1908) I have taken six species. In various parts of the Tyrol I found large numbers of *Chrysochloa tristis*, Fab. Also in this region were *C. elongata*, Suffrian and *C. vittigera*, Suffrian the last of which I found again this year near Zermatt. At Grindelwald I found the small *C. frigida*, Wissman, and also *C. gloriosa*, Fab. This is a very variable species as regards size and colour. which may be black, blue, green or with red stripes on a green or blue background. I have found this species in the high montane zone and all the way up to the nival zone to a maximum altitude of 2600 metres at one place near Zermatt. It has been recorded as high as 3000 metres (Kosch, 1966).

On a rather unusual plant, *Adenostyles leucophora*, Reichb., at a height of 2600 metres near Zermatt, I took a specimen of *C. cacaliae*, Schrank.

In the nival zone I collected some interesting Carabids. In Britain *Amara quenseli*, Schönherr can be found in the Scottish Highlands and Fowler (1887) states that it has been found to considerable elevations on the continent. I found a dead specimen at the top of the Gornergrat near Zermatt at a height of 3150 metres. Another typical high altitude species is *Nebria castanea*, Bonelli (not Brit.) which I found under an exposed stone in a mainly snow covered area above Station First, Grindelwald. At the edges of snow patches *Bembidion bipunctatum*, Linn. was found in large numbers. Other beetles found in meltwaters were *Helophorus gracialis*, Villa (not Brit.) and *H. nivalis*, Gillmeister (not Brit.) both of which belong to the *H. brevipalpis*, Bedel group. I collected some Dytiscids from a small pool near Stellisee, Zermatt (alt. 2536m) namely *Hydroporous nivalis*, Heer (not Brit.) and

Agabus biguttatus, Oliver.

During my three visits to the Alps I took a total of over forty non British species at high levels and a considerable number that are found in Britain. Many of the latter are very uncommon or rare in Britain and are found only in remote highland areas. In the Alps I had the benefit of chairlifts, cable cars and mountain railways (at a cost) to reach the heights. I was also able to enjoy better weather than one would expect in Scotland or Wales, apart from a few days of snowstorms at Serfaus in August! I. M. White (4377j)

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OBSERVATIONS ON THE DARK BUSH CRICKET

These insects were kept in an aquarium twelve by eight by eight inches indoors facing south east; a thermometer was kept nearby. The period of these observations was from the second of September to the seventh of December nineteen-sixty-nine.

2.9.69 Caught two dark Bush Crickets (males). Put them into the aquarium with a layer of chippings and a layer of soil also put a medium size stone and a piece of rotten log with a clump of coarse grass. Also two or three twigs of elderberry and a few dead leaves were put in. Around 11.00 hours a piece of apple was put in and twenty minutes later one cricket started eating.

7.9.69 Caught one femal D.B.C. at Blackdown (the field nearby). I put her in the tank with the two male crickets.

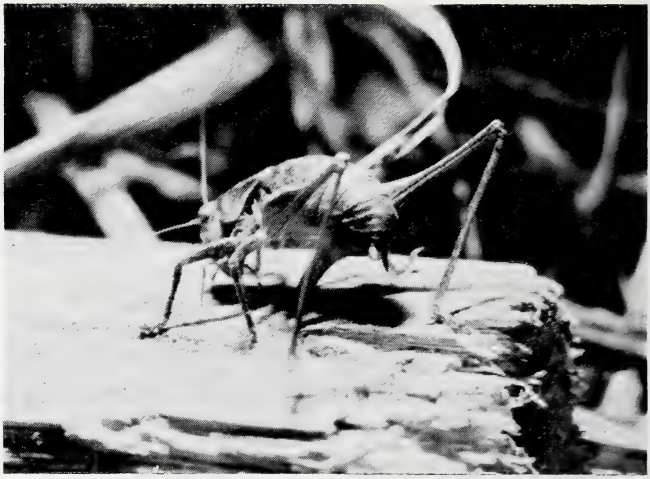
9.9.69 Caught another female at Blackdown and put her with the other three crickets.

10.9.69 One of the females tried to push her ovipositor into the bark of the elder twig to lay her eggs. She tried to nibble the bark first before trying to insert her ovipositor during which time she was doubled up in a "U" position.

13.9.69 18.25 hours Temp. 18°C. Female D.B.C. trying to insert her ovipositor into the old log in the tank weaving and wriggling her abdomen. The process taking about twenty-five seconds. 22.10 hours female still laying.

14.9.69 Caught another male D.B.C. near Exeter. Unfortunately he lost one of his hind legs. 6.45 hours Temp. 17°C. Put three pieces of apple into the tank.

17.9.69 8.35 hours 18°C. A female D.B.C. is eating from a piece of



A female Dark Bush Cricket ovipositing

apple.

19.9.69 22.45 hours two female D.B.C.s had a slight squabble over who should get on to the rotten wood. One is still trying to find a suitable crevice in which to lay her eggs. She used her rear left foot to push her ovipositor into the right place.

20.9.69 Caught another female at Blackdown. 15.49 hours 20°C. One of the females is trying to lay.

21.9.69 23.13 hours. One of the females is trying to oviposit in an old wooden stem as big as herself. Now she is trying a piece of rotten wood put in this morning. Now she has returned to the woody stem and has practically landed on her back with it. Another female is trying to lay in the old log.

22.9.69 7.06 hours. One of the females is inserting her ovipositor into the old log. 16.12 hours. Another female is eating a piece of cooking apple. 21.50 hours. Put a piece of white polystyrene into the tank. One female inserted her ovipositor into it and she and the block tipped over. 22.00 hours. She nibbled the block before inserting her ovipositor. 22.19 hours. Nibbled a hole in the block before inserting her ovipositor although she and the block again tipped over. She seems to be determined to carry on. At least two eggs have been laid in an old dry woody stem about two inches long. These females seem to be quite strong as one has nearly pushed the polystyrene block back to its original position.

23.9.69 6.30 hours. One of the females appears to have some whitish substance clinging to her abdomen.

24.9.69 20.45 hours. One of the females has inserted her ovipositor into the polystyrene two or three times. 20.55 hours. Another female is

The last remaining pair of Dark Bush Crickets

cleaning her ovipositor with her mouth. Soon after she started egg laying.

24.9.69 22.59 hours. A female appears to be trying to get hold of a male D.B.C. but he seems to be playing hard to get. Both of them are quite close together now. He had grasped her for a second but she fell. She seems to dictate the proceedings. It appears that the female manoeuvres the male into position. Another female is having a bite at a piece of apple.

25.9.69 6.25 hours. Male D.B.C. having a nibble at a piece of apple. 6.30 hours. One of the females has hanging from her abdomen a frothy white bubble. One of the males is doubling up to clean his abdomen.

25.9.69 12.50 hours. A female has white substance clinging to her abdomen (the same female as this morning?). 20.35 hours. Two females nibbling at the pieces of apple.

26.9.69 Put fresh pieces of apple in the tank.

28.9.69 10.05 hours. All insects are up under the roof of the tank sunning themselves. Bright sun, but temperature reads 16°C. Caught another female near Exeter.

30.9.69 14.25 hours. The female caught yesterday looks sick. I put her into the garden under the sage bush.

5.10.69 21.38 hours 21°C. Put a piece of gladioli with blackfly on it into the tank. One of the females ate a couple of blackfly. Then she started egg laying near the piece of gladioli. 21.45 hours. Another female ate some blackfly then started to lay eggs nearby. The crickets appear to feed intermittently on the blackfly.

9.10.69 6.28 hours 19°C. One of the males is eating an apple pip. He is holding it with his front legs whilst nibbling: at 7.10 hours is still

eating it.
11.10.69 10.30 hours. Found the sick female on the rhubarb leaf in the back garden. She must have travelled about twenty yards from the sage bush (where she was put on the 30.9.69). She was returned to the tank with the other insects.
13.10.69 22.10 hours 19°C. One of the females nibbled a hole in an old dead piece of fern stalk and inserted her ovipositor.
17.10.69 22.47 hours 21°C. One of the females is eating from a piece of cooked beef another from a piece of cooked potato. One male and one female each eating from a crust of bread.
18.10.69 24.08 hours 19°C. A male is nibbling at a crust of bread and is stridulating whilst eating.
27.10.69 21.40 hours 17°C. 16.30 hours. Put a piece of stinging-nettle into the tank. 16.50 hours. A female is nibbling at the stinging-nettle leaves.
25.10.69 23.15 hours. Measured D.B.C. egg which was found to be four and threequarters millimetres long and a little over one millimetre wide at the thickest part.
27.10.69 21.40 hours 17°C. Two females eating from a piece of chicken.
29.10.69 22.20 hours. A male is mating on the roof of the tank. The female is on top of the male.
2.11.69 19.00 hours 17°C. Put in a dead female grasshopper. A female D.B.C. found her and proceeded to tear off her wings and eat away the pronotum holding the grasshoppers head in between her front legs, she nibbles away at the base of the pronotum towards the head. 21.15 hours 17°C. No sign of the grasshopper.
3.11.69 Put in a live grasshopper but after a quarter of an hour the crickets appeared to take no notice of it. 19.36 hours. Female cricket is very close to the grasshopper which is looking less lively. It is as though they are waiting for the grasshopper to die before they eat it. The female crickets seem to jealously guard their prey, they will argue with the male but females will try to avoid one another when laying eggs or eating. 10.10 hours. Male D.B.C. got hold of the grasshopper which did not have much life left in it and started to eat it. 20.19 hours. Only the abdomen left of the first grasshopper. A female is eating the second grasshopper.
3.11.69 Caught another female D.B.C. I first noticed the unusual colour of her excrement a few hours after she had had a meal off of the dead grasshopper.
7.11.69 Evening. She seems to want to bury herself. A male cricket is attacking her. She is taken out and put in a tank on her own.
8.11.69 10.00 hours. The female cricket died. I took the following measurements from her. Tip of head to tip of ovipositor 25mm. Antennae 21mm. Femur 18mm. Tibia 16mm. Tarsus 5mm. Ovipositor 9mm.

12.11.69 15.47 hours 13°C. Put a female grasshopper into the aquarium. 22.15 hours 14°C. There appears to be no sign of the live grasshopper although there is a part of an abdomen amongst the ground litter.
14.11.69 15.15 hours 12°C. Found a female D.B.C. dead.
21.11.69 One female has a leg missing, another is rather poorly and seems to be trying to bury herself in the bracken. A male has lost a hind leg.
22.11.69 12.18 hours 10°C. The sick female has died. A male with only three legs has an injured head, could this be cannibalism.
28.11.69 A male and a female have died. The body length of the male was 16mm.
1.12.69 22.03 hours 13°C. One of the females has her ovipositor inserted into an old log and is probably laying. A male is chirping again after about a week of silence. For about five hours I placed a small reading lamp on the top of the aquarium, I also put a couple of slices of apple in the tank from which a male took a nibble. I think the female is on her last legs. 12.20 hours 12°C. The female is egg laying in the old rotten piece of log. About half an hour ago she was up on the roof sunnning herself under the reading lamp.
2.12.69 The female died today but the last male is still surviving.
7.12.69 The male D.B.C. has died. Mrs. G. R. Davis (4484)

A COMPENDIUM OF ODDITIES

Being a collection of unusual observations made by my friends and I over the last ten years.

A Silver Y (*Plusia gamma,* Linn.) at sugar. Fort Fareham, South Hampshire, 20.9.1963.

A wriggling abdomen of the Pine Hawk (*Hyloicus pinastri,* Linn.) adherent to a stone. Rhinefield, New Forest, Hampshire, 1970. The abdomen belonging to the female of the species it was retained for eggs but none were forthcoming.

Apparent resin on a pine trunk at Whitley Wood (pine plantation), New Forest, South Hampshire, was found to be ova of this species. The source was a crippled female. The ova were fertile and a fine series was bred.

A worn Chamomile Shark (*Cucillia chamomillae*, Schiff.) at MV, Catisfield, Fareham, South Hampshire, on the night 27th to the 28th March, 1971. My earliest date.

A Small Angle-shades (*Euplexia lucipara,* Linn.) at Pepsi-cola. West Walk, Wickham, South Hampshire, 19.6.1970.

A multi-pairing of a sand-wasp species (*Ammophila* sp.). A male on a male on a male on a female running (!) on the sand at Hayling Island, South Hampshire, August 1971.

A dead badger containing around sixty Shore Sextons (*Necrodes littoralis,* Linn.), Whitley Wood.

A Wood Mouse and two toads at sugar. The former species at

Fort Fareham, the latter at Hayling Island and Catisfield. Whilst one toad was waiting at the bottom of a post probably waiting for drunken moths to fall (cf. Hedgehogs in Newman's "Butterfly Farmer"), the other a goliath of the species, was waiting for me as I thrust my face close to a horizontal patch. Whether moths or sugar accounted for his girth I will never know, but he was certainly unsteady in his gait.

A Silver-Y (*Plusia gamma,* Linn.) on 4–5.12.1970, at MV Catisfield. My latest record.

A Comma (*Polygonia c-album,* Linn.) larva on Broom (*Sarothamnus scoparius,* Linn.) at Catisfield, date not noted.

A tent-peg with a tumour, presented by a scout in Dorset in the summer of 1964. It was a Puss moth cocoon (*Cerura vinula,* Linn.).

Two male Vapourers (*Orgyia antiqua,* Linn.) at MV, one at Catisfield on 3–4.10.1969, and the other around 23.00 hours, 19.8.1971, at Browndown, Lee-on-Solent, South Hampshire. Also one at light (not MV) Waterlooville, Hampshire, in 1969. See the recent literature.

Three Small Whites (*Pieris rapae,* Linn.) on horse dung at Micheldever, Winchester, Hampshire on 19.8.1971.

A Pug of Great Age. On 14–15.5.1971 I took some Oak-tree Pugs (*Eupithecia dodoneata,* Guen.) in my MV trap and placed a couple of females and a male in a small cage with hawthorn blossom and nectar-bearing flowers. The male soon departed this world but the females, although laying fewer than a dozen ova between them, lived on. One was flying vigorously on the evening 2nd of June, but died the following evening, a grand old lady and full of days (nineteen plus).

Malformed genitalia in two Minors. My first Minor this year was a male Marbled (*Procus strigilis,* Clerk) at MV Browndown on 22.5.1971. It had both pairs of lateral processes of the valvae fused inferiorly. There were other very minor genitalic abnormalities. A male of the same species appears to have a cornutus in the ductus ejaculatorius. Unfortunately the vesica was not inflated so the possibility of herniation of a small pouch of vesica into the ductus cannot be eliminated, although there is no microscopic evidence of this.

27th August, 1971 Richard Dickson (3674)

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COLLECTING — A PERSONAL VIEW

Yes, I used to collect and still do on occasion. As a young amateur entomologist my collecting efforts were encouraged at school and gradually I built up a reasonable knowledge of our insect fauna. However some of the drive in collecting was in finding that last specimen that completes the family or that enabled a "Bet you haven't found this

one" and "Where did you find that" type of conversation, much as you might expect young stamp collectors to talk. Much collecting is done on these lines and in my opinion this is wrong. If a dead insect is merely a prize with which to dumbfound one's rivals then that insect may well have been an inanimate object.

However my collecting days did give me knowledge in this aspect of natural history and, as I specialised a deeper understanding of the more scientific side of my hobby and of science in general. With this basic knowledge I could now show my fellow naturalists the joy that could be had from the study of insects and with the use of a net could select those insects that illustrate some feature of an interesting life cycle or mode of life. I also delight in letting that insect go and so ensure that that way of life continues. However I do not object if a younger colleague desires to keep it. I no longer collect with the aim of building up a collection but I must admit to taking the occasional specimen that I consider to be of interest to a larger audience. As for maintaining a collection I find that a collection of slides is simpler and easier to maintain. It is also of more interest to other people of similar interest. Further, the technical competence required to produce a good photograph is more demanding of skill and patience than the wielding of net.

So if entomology is to satisfy a collecting instinct, and it has to be insects, then I would much prefer the use of the camera. However it has to be realised that our younger members do not possess the means to acquire the equipment this entails and to ban collecting would only stultify their interest. I do disapprove of irresponsible collecting and the American practice of collecting around the states is an example of this. The aim being to collect one specimen of each species from as many states as possible.

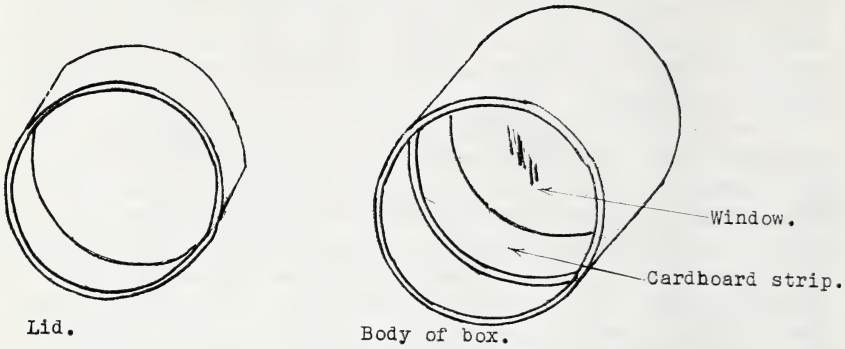
All this has concerned the amateur with an interesting hobby. The dedicated amateur with his extensive collections is another matter. If he has the time and the facilities then his work may rival that of the museums. But so many of these dedicated people appear to be dedicated only to collecting more specimens and varieties than anybody else. University courses sometimes demand a collection and this serves the same purpose as my collecting did but even this is now being left out of many university syllabi.

And then comes the research worker. Generally these people have the knowledge, experience and the common sense to collect responsibly.

But for the amateur, collecting may be an essential part of gaining a preliminary background, but I would expect the collector to gradually realise when best to leave collecting to those less experienced than he. His interest and dedication will lead him to enthuse others in his interest and by that time he will have been able to aquire a suitable camera.

Ron Allen (3628)

MAKING PILL BOXES



I do not usually consider that making ones own equipment is a worthwhile occupation for the amateur entomologist as will be known from my previous letter. There is however one item much in use by the person collecting or studying insects, that in my experience is worth the effort and gives a cheap and very satisfactory result. This is the "windowed" pill box. One of the main reasons I may say for writing this is the very odd and quite unsuitable containers that I have seen some of my young friends using when we have been out in the field together. These have included tobacco tins. First, visit a chemist, and I would advise one of the old fashioned type rather than a modern "drug store", and ask for salve or ointment boxes. These are small boxes made of thin white cardboard, and they range in price from 12p to 20p per dozen. There are four sizes, $1\frac{3}{8}$in., $1\frac{5}{8}$in., $2\frac{1}{8}$in. and $2\frac{1}{2}$in., so that the four of them fit together into a neat nest. You will also need to obtain a quantity of transparent (glass clear) thin plastic sheeting. This can be purchased from one of the "Do it Yourself" stores, if this cannot be got, a piece of acetate sheeting from the local stationer will suffice, though this is a good deal thinner than I like myself, except for the smaller boxes.

Next press out gently the bottom of the box, it comes out quite easily and is a small cardboard disc. Then give the body and lid of the box two coats of patent knotting (shellac dissolved in methylated spirits) which can be obtained from any ironmonger. Allow 24 hours between each coat. This gives it a tough and leathery appearance and makes it strong and waterproof. Take the cardboard disc bottom and lay it on the clear plastic sheeting and score around the edge with a fine point, a large old setting needle will do. Then cut out around the score mark with a large pair of scissors. The result is a "window" which you return to the pill box in place of the bottom. Finally cut out a small strip of thin cardboard $\frac{1}{4}$in. to $\frac{3}{8}$in. wide and the length of the inside circumference of your pill box. Apply a coat of glue, "Seccotine" or "Croid" will do, and stick this to the inside wall of the box, this will

keep the "window" firmly in place. I have a great many of these and they have given me long and good service, but it is very important not to omit the shellacing, or varnishing if you prefer, otherwise the boxes will soon disintegrate. G. Prior (3909)

LETTERS TO THE EDITOR

Dear Sir,

I write to ask if the Society is aware of two recent developments in the field of "Pest Control". These are the use of (a) bacteria and (b) viruses to control the larvae of lepidoptera. Materials based on the former are available and have been used by farmers and growers in this county. As explained to me, by the representative of one of the firms involved, the risks with bacterium spp. seem remote as the treated leaf has to be eaten by the larvae—when its gut dissolves within a couple of days. Also the material does not seem very persistent and has to be applied again following rain or irrigation. However, the strain/s are of American origin and on this score one questions the wisdom of introducing such a foreign form.

In general I feel that we should welcome these more specific "insecticides" rather than D.D.T. and Dieldrin etc. but we should also ensure that the claims made are correct and that there are no unforeseen side effects. Perhaps one of our more scientifically minded members could carry out some experimentation?

The situation with regard to viruses is probably more serious, they being usually easily transmitted and highly infectious, e.g. myxamatosis.

We shall certainly see these materials being widely used in this country in the future—as they have been in the U.S.A.—and my fears may be unfounded but it might be better to be safe rather than sorry with regard to British Lepidoptera. J. S. Butter (4664)

Dear Sir,

In the February edition of the *Bulletin* of The Amateur Entomologist's Society Mr Shaw (4390) in his article about Common Blues mentioned obtaining a male of smaller size than "normal".

On Wednesday the 21st of May I netted an Orange Tip (male) as it flitted over a wall in Clent, a small village near Birmingham. On examination the catch proved to be smaller than "normal". Most Orange Tips I later checked had a span of 43-45mm but this specimen was only 34mm from wing tip to wing tip. The Orange Tip was quite lively and looked healthy enough. The wing markings were quite normal and the shape was not unusual but like everything on this specimen, miniturised. Six days after I first saw it, the butterfly died so I added it to my collection.

The reason for this specimen being so small is hard to say. The butterfly was on the wing at a normal time of year. Maybe the proper food plant was not available. K. A. Moseley (4733j)

CAMBERWELL IN EALING?

During August 1970 I happened to be on holiday and went to a piece of waste ground that banks the Grand Union Canal in London between Osterly and Hanwell.

I captured a Comma (*Polygonia c album*) and saw a variety of other species. I soon reached the canal, and as if by a given signal rounding a spinney came the port-wine and white markings of a Camberwell Beauty (*Nymphalis antiopa*). To my dismay it shot down the canal at what appeared to be Mach. two.

Up the canal from this spot is a woodyard and I think that this butterfly might have come up the canal by means of a Scandinavian woodbarge.

R. Moore (4508j)

USEFUL PAMPHLETS JUST PUBLISHED

Two small pamphlets have been sent to me which I would like to bring to the attention of our members. The first is called "OUTDOOR STUDIES CODE". This outlines the code of behaviour that all naturalists (and this of course includes the entomologist) who are interested in the conservation of the countryside but also the good name of the naturalist who ventures into it. Apart from setting out how we should behave in the country it also gives a great many useful facts regarding legal rights in connection with: Rights of Way, Commons, Access agreements, Foreshore, etc., etc. It also gives information regarding facilities, records, and a list of useful addresses. This leaflet has been prepared by the:

FIELD STUDIES COUNCIL,
Secretary, R. S. Chapman, Esq.,
9 Deveroux Court,
Strand, W.C.2.

The other leaflet is called "CODE OF CONDUCT" and is a code of conduct for the preservation of wild plants. A great many entomologists are also botanists, in fact it is difficult to study entomology without a fair knowledge of plants, and this leaflet outlines the rules that one should observe in relation to wild plants. It has been issued by:

THE BOTANICAL SOCIETY OF THE BRITISH ISLES,
Hon. General Secretary, c/o Department of Botany,
British Museum (Natural History), Cromwell Road, S.W.7.
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